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 **Reflection[®] 2+**

Digital VT320
Terminal Emulation

 **Reflection[®] 4+**

Digital VT340 Terminal
Emulation with ReGIS
and Sixel Graphics

Technical Reference

▲ D O S



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Reflection 2 Plus and Reflection 4 Plus *Technical Reference*

Version 5.0

May 1994

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Getting Started

Welcome to Reflection connectivity software by Walker Richer & Quinn (WRQ). WRQ develops software that connects your personal computer to applications and data residing on minicomputers and mainframes in enterprise-wide information networks.

Reflection establishes and maintains communication between your PC and a host computer. With Reflection, your PC *emulates*, or operates like, a Digital VT series terminal. As far as the host is concerned, your PC running Reflection is a VT terminal: you can use any host application intended for a terminal. Now all the stand-alone features of your PC are complemented by the ability to communicate with your VMS, UNIX (including ULTRIX), or other asynchronous host.

If you're new to Reflection or to terminal emulation, the "Introducing Reflection" chapter in this section describes some of the features that Reflection and terminal emulation have to offer. It also explains the conventions used in this manual, and describes the other manuals in the Reflection documentation set.

If you're a current Reflection user and are upgrading from an earlier version, "New Features in Version 5.0" on page 6 describes the features that have been added to this version.

Chapter 2, "Installing Reflection," explains how to install a single-user and a server version of Reflection. All users should read this chapter.

Chapter 3, "Starting Reflection," explains the different methods with which you can start the product, and describes how to save your Reflection settings.

Chapter 4, "The Reflection User Interface," describes how to use Reflection's new graphical user interface.

Chapter 5, "Using the Keyboard," provides listings and descriptions of the keyboard functions available in Reflection.

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Introducing Reflection

This manual describes two Reflection products:

- ▲ *Reflection 2 Plus*, which emulates the Digital VT320 and VT420 terminals (except for the split screen and dual session features of the VT420). It also emulates an ANSI terminal for communicating with an SCO UNIX host or a computer bulletin board service (BBS).

Reflection 2 Plus can be run in bit-mapped mode with the /B132 startup switch (see page 29), which gives you 132-column mode without having to purchase a special video adapter. Double-high, double-wide characters are displayed if you have an EGA or VGA adapter. See “Requirements” on page 11.

- ▲ *Reflection 4 Plus*, which emulates the same terminals as Reflection 2 Plus, adding emulation of the VT241 graphics terminal (including all of the VT340 terminal’s ReGIS and color graphics commands) and the Tektronix 4014 terminal.

Both Reflection 2 Plus and Reflection 4 Plus also include Application Program Interface (API) libraries, which give you programmatic control of Reflection, and a command language debugger.

With Reflection’s multitasking capability, you can maintain your host connection and run other PC programs at the same time. Multitasking allows you to quickly move between tasks, with Reflection continuing to work in the background as you use another PC application in the foreground.

You can transfer data between the PC and a host computer, or send data from Reflection’s display memory to a printer or a disk file. A sophisticated protocol for transferring files from the PC to a host using a Digital VMS, ULTRIX, or other UNIX host is included; Kermit, Zmodem, and Xmodem are also supported.

Keyboard mapping, downline loadable font support, and a session manager for your network connections are all included. Reflection also has its own command language, providing a shortcut to data communications operations. You can customize command language scripts to fit your needs.

New Features in Version 5.0

The following section outlines the new features in version 5.0 for users who are upgrading from an earlier version of Reflection.

Setup Program

The procedure for installing Reflection begins on page 15. With version 5.0, the Reflection Setup program has changed as follows:

- ▲ You have the option of installing Telnet support with Reflection. See page 8 for a description of Telnet support.
- ▲ Reflection offers online help in English, French, and German. You can choose to install one or more of these help files, or none. See page 7 for a description of Reflection's online help system.

User Interface

The most noticeable change to Reflection is its new graphical user interface, which incorporates a menu bar with pull-down menus and dialog boxes. The interface is consistent with that of WRQ's Windows emulation products, and meets CUA (Common User Access) standards for functionality and ease of use.

Mouse navigation is now an option, but all the important keystroke shortcuts and function key sets are still available. Command files, configuration files, and keyboard mapping files from earlier versions of Reflection are fully compatible with version 5.0.

Instructions for using the new interface are described in Chapter 4, "The Reflection User Interface," starting on page 45. Descriptions of every menu, command, and dialog box are included in Section 3, "Reflection Menu Reference," starting on page 169. If you have upgraded from an earlier version of Reflection and want to find the new locations of setup fields, see Appendix A, "New User Interface Locations," starting on page 659.

Online Help

Reflection offers an extensive online help system that covers over 200 topics ranging from configuring and customizing Reflection to connecting to a host and transferring files. The new help system features a list of major topics, an index, keystroke help, and hypertext links that allow you to jump through a series of related topics. The “Getting Started” option on the Help menu introduces you to the online help system and the new graphical user interface.

Mouse Support

Reflection includes mouse support, which lets you navigate the user interface with point- and-click techniques, and perform copy and paste operations. If you are using a mouse with Reflection, make sure that the mouse driver software that comes with your mouse is loaded before starting Reflection. See “Mouse Techniques” on page 52 for instructions on how to use the mouse with Reflection. For copy and paste instructions, see page 354.

File Transfer

Transferring files between a PC and host is simpler than ever in version 5.0. Like its Windows counterparts, Reflection for DOS now features predefined file transfer settings for the most commonly used VMS and UNIX host connections. For information on how to transfer files, see Section 5, “Transferring Files,” starting on page 367. The File Transfer dialog box and the File Transfer Setup dialog box are described on pages 183 and 189 respectively.

Host Program for Alpha VMS Systems

For file transfers using the WRQ protocol, Reflection includes a host program for Digital's Alpha VMS systems. The PC filename for this host program is ALPHALK2.EXE; the program is renamed VAXLINK2 once it is uploaded to the host system. See page 381 for information on uploading the host program to an Alpha VMS system.

All Plus Features Included

Version 5.0 merges the features of Reflection and Reflection Plus into two products called Reflection 2 Plus and Reflection 4 Plus. This means that all Reflection users now have the features that previously were reserved for the Reflection Plus products: support for third-party LAN connection software, a command language debugger, and the full set of Reflection's Application Program Interface utilities.

NLAT

Reflection supports NetWare for LAT from Novell. NLAT provides PCs on Novell networks with access to LAT services. See Chapter 11, "Support for NetWare for LAT," starting on page 147.

Extended NASI

Extended NASI support has been added to Reflection under the Connection Manager datacomm option. See Chapter 12, "Extended NASI," starting on page 157.

Telnet Support

Reflection provides Telnet support as an option that can be installed with Reflection, or can be added later. Telnet support lets you use PCs as virtual terminals over various third-party TCP/IP products. See Chapter 10, "Telnet Support," starting on page 137.

Zmodem

Reflection supports the Zmodem protocol for transferring files. Zmodem is a public domain protocol available on many bulletin boards and host machines. See Section 5, "Transferring Files," for general information on transferring files, and Chapter 32, "File Transfers Using Zmodem," starting on page 431.

Connection Types

In the Basic Setup dialog box and the Datacomm Setup dialog box, the Connection Types COM3 and COM4 have been renamed COM3-IR10 and COM4-IR11 respectively to indicate their IRQ values.

Startup Switches

Version 5.0 includes the following new startup switches and options (see "Starting Reflection" on page 29 for more information):

- /I2
- /K4
- /K5
- /LBIG5
- /LHANG
- /MEM:ML
- /MONO-VGA
- /Y2

Changes to Reflection Command Language

Following is a list of parameters that have been added to Reflection's Command Language, or that have changed since version 4.3. See the *Reflection Command Language* manual for details.

New RCL commands are:

```
$UPI  
ZRECEIVE  
ZSEND
```

New SET parameters in Reflection 2 and 4 are:

```
SET ALT-MENU-TOGGLE {YES | NO}  
SET COLUMNS-PER-SCROLL {1-80}  
SET CONFIGURE-NASI-PORT {YES | NO}  
SET DATACOMM-PORT <value>  
SET DEFAULT-TRANSFER-METHOD {ASCII | BINARY | IMAGE}  
SET INITIAL-MENU-BAR {YES | NO}  
SET INT14-INITIALIZATION {8-BIT | 7-BIT | NONE}  
SET KERMIT-HOST-MODE {AUTO | SEND | SERVER}  
SET SAVE-FROM-SCROLLING-REGION {YES | NO}  
SET SCROLLING-SPEED <value>  
SET SHOW-INT14-ERRORS {YES | NO}  
SET TELNET-TERMINAL-ID <string>  
SET ZMODEM-ALLOW-AUTO-DOWNLOAD {YES | NO}  
SET ZMODEM-DELETE-CANCELLED-FILES {YES | NO}  
SET ZMODEM-DISPOSITION <value>  
SET ZMODEM-PACKET-SIZE <32-1024>  
SET ZMODEM-START-REMOTE-RECEIVE <string>  
SET ZMODEM-START-REMOTE-SEND <string>  
SET ZMODEM-TRANSLATE-CHARS {YES | NO}
```


Requirements

Reflection requires an IBM personal computer (or 100% compatible) with at least 256K of read/write memory, although 512K RAM is strongly recommended for taking full advantage of Reflection's multitasking and print buffering capabilities.

Reflection 2 requires:

- ▲ A monochrome, color, or enhanced graphics display adapter card
- ▲ A monitor capable of displaying 80 columns by 25 rows

Reflection 2 bit-mapped (Reflection 2 with the /B132 start-up switch) and *Reflection 4* require:

- ▲ An EGA or VGA card with 256K

Reflection is designed to be used in conjunction with a host computer. Host connections require the following additional equipment:

- ▲ A communications port: a serial port, an internal modem card, or a local area network card
- ▲ Another computer with asynchronous communications capabilities to serve as the host computer
- ▲ A link to the host computer: a direct RS-232 cable connection, an internal modem card, an external modem with an RS-232 cable to the PC, or appropriate LAN hardware and software

In addition, to use VAXLINK2 (Walker Richer & Quinn's proprietary host file transfer program) your host must be running VAX/VMS version 5.x or greater.

Documentation Overview

The full Reflection 2 and Reflection 4 documentation set consists of the *User Guide*, the *Advanced Topics* manual, the *Command Language* manual, and this *Technical Reference*. In some cases (with a limited site license, for instance), the end user receives only the *User Guide*.

- ▲ If you are new to Reflection or terminal emulation, the *User Guide* provides a general overview and step-by-step instructions for using Reflection. It explains how to install and run Reflection, connect to a host, and introduces Reflection's features.
- ▲ *Advanced Topics* covers keyboard mapping in full detail (the *Technical Reference* explains enough about remapping for the majority of users), ReGIS commands and Tektronix graphics (for Reflection 4 users), and Reflection's Application Program Interface (API).
- ▲ Use Reflection command language to configure Reflection and carry out file transfer and communications operations: it is an alternative to using the menus and function key labels. Command language is compatible across Reflection products and versions. The *Command Language* manual details using commands singly and in command files and includes an alphabetical listing of all available commands.

This *Technical Reference* provides detailed information on Reflection and the terminals it emulates. It is intended to provide complete, accurate, and easily accessible information on Reflection to help you establish communications with a host computer. The manual does not include overly specific examples of host interaction (for instance, how many times you need to press **[Enter]** to get the login or host prompt). These are best left to your system manager or host documentation.

This manual is organized into the following sections:

"Getting Started" describes how to install and start Reflection, navigate the user interface, and use Reflection's default keyboard functions.

"Getting Connected" explains how to establish a direct, modem, or network host connection.

"Reflection Menu Reference" discusses the commands on Reflection's menus.

“Operations” discusses all aspects of remote and local operations. It contains information on Reflection functions, memory management, and disk and printer operations.

“Transferring Files” provides file transfer procedures for VMS (including Digital VAX and Alpha computers) and UNIX (including ULTRIX) systems. Reflection’s support for the Zmodem, Xmodem, and Kermit public domain protocols, FTP, and the Old-WRQ protocol is also explained.

“Troubleshooting” provides techniques for solving problems you may experience when using Reflection, including communications and file transfer troubleshooting solutions. It also provides a listing of Reflection error messages.

“Control Functions” explains what control functions are and how to use them with Reflection. It includes both DEC and ANSI sequences.

“Appendices” include sections on supported character sets, character translation, and national keyboards and characters. A Glossary follows the Appendices.

There are a number of control function indexes: the control functions are shown sorted by function, by sequence, and by DEC mnemonic. These are followed by a conventional index that covers the entire manual. The *Programmer Reference Card* in the back of this manual also lists control functions.

Documentation Conventions

The following conventions are used in this manual:

- ▲ *Italics* indicate variables or values for items in a list box, text box, or option; for example, setting the Baud Rate to 19200.
- ▲ Reflection command language keywords, directories, and file names are shown in capital letters, such as MSAVE and C:\REFLECT.
- ▲ This typeface indicates things you should type, host responses, and samples of programming language.
- ▲ The references in this manual to graphics apply only to Reflection 4.
- ▲ RCL stands for Reflection Command Language.

- ▲ Keys are displayed like this: `[Shift]`. Keys that should be pressed simultaneously are shown joined by a hyphen, as in `[Alt]-[F4]`. Don't type the hyphen.
- ▲ This is how the Enter key on the main keyboard is shown: `[Enter ↵]`. On some keyboards, it is called the `[Return]` key.
- ▲ Parameters enclosed in angle brackets (< >) indicate that something must be added to complete the command, such as a password or a PC file specification. For example: `TRANSMIT "<password>^M"`. Do not include the brackets when entering the parameter.
- ▲ A <string> is usually a quoted string, that is, the characters are enclosed in quotation marks. In the example above, "<password>^M" is the quoted <string>.
- ▲ Parameters enclosed in braces indicate a set of alternatives, one of which must be used to complete the command. For example, `SET CHECK-PARITY {YES | NO}` means you must specify either YES or NO to complete this command.
- ▲ The term <filespec> is used as a shorthand way of referring to a file's complete path and name. For example, a full filespec might be: `C:\REFLECT\R2.EXE`
- ▲ The ASCII control character is represented by a caret (^). For example, `[Ctrl]-[M]` (carriage return) is shown as ^M.
- ▲ `ESC` indicates an escape control code, `CSI` indicates a control sequence introduction character, and `DCS` indicates a device control string. The three-letter mnemonic representation is used in the documentation to make the sequences easier to recognize. Control functions are case sensitive and must be typed exactly as shown. Other control codes are listed on page 529.
- ▲ The eight labels along the bottom of any Reflection screen (if displayed) correspond to the function keys `[F1]` through `[F8]` on the keyboard.
- ▲ Most commands can be typed in uppercase or lowercase. The notable exceptions are control functions, which must be typed precisely as shown.

Installing Reflection

The Setup program decompresses Reflection files and creates a working copy of Reflection. (If you are installing Reflection onto a floppy disk, use a high-density disk.) It also guides you through the process of configuring Reflection and its working environment. As you run Setup you'll be able to:

- ▲ Specify startup switches for Reflection.
- ▲ Incorporate keyboard mapping information into a configuration file.
- ▲ Optionally modify your AUTOEXEC.BAT and CONFIG.SYS files (you'll be able to preview any changes that are proposed, and backup copies of your original files are created if you accept the changes).
- ▲ Install Telnet support that lets you use Reflection with third-party TCP/IP products.
- ▲ Install online help files in English, French, or German.

After you install Reflection, the first three configuration options are still available; just type `SETUP` at the DOS prompt in your Reflection subdirectory, then choose the "Configure Reflection" option from the Setup main menu. The Telnet and help file options can also be added using Setup, but will require your Reflection product disks.

You can also use the Setup program to decompress individual files from your product disks. Use the following syntax at the DOS prompt:

```
SETUP /D <compressed file> [<output directory>]
```

Type `SETUP /?` for information on decompressing files. The Reflection executable files (R2.EXE and R4.EXE) cannot be decompressed using this method. You must run Setup and choose an installation option to decompress these programs.

Installation Procedure

To install Reflection, perform the following steps. At each step in the installation process, Reflection allows you to return to the Setup main menu or to the previous installation screen in case you need to change an installation option.

1. Put the first Reflection disk in drive A or B.
2. Type `A:SETUP` or `B:SETUP` at the DOS prompt and press `[Enter]`. This displays Reflection's welcome screen, and instructions for running the Setup program if you have a monochrome monitor.
3. Press `[Esc]` to exit, or any other key to continue with Setup and display the Setup main menu.

Reflection Setup Utility

Use cursor keys to highlight an item, then press Return to select it

Install Reflection with Telnet support

Install Reflection

Install Telnet support

New features in this version

Configure Reflection

Exit to DOS

Install the Reflection software on a hard disk or floppy.

Select this option if you are a first time Reflection user or are updating an existing copy of Reflection AND you want to install Reflection's Telnet Support for 3rd party TCP/IP stacks.

Reflection Setup Main Menu

The Setup main menu has the following options:

- ▲ “Install Reflection with Telnet support” installs the Reflection software as well as Reflection’s Telnet support for third-party TCP/IP products.
 - ▲ “Install Reflection” installs the Reflection software.
 - ▲ “Install Telnet support” lets you add Reflection’s Telnet support option.
 - ▲ “New features in this version” describes what is new in this release—it is intended for users who are already familiar with Reflection.
 - ▲ “Configure Reflection” lets you set up your Reflection environment using startup switches that customize performance and memory usage. It also walks you through the process of mapping your keyboard, described later in this chapter. You don’t have to use this option if you are satisfied with the configuration choices you make when you first install. You can always reconfigure your installation later by running the Setup program again.
 - ▲ “Exit to DOS” exits the Setup program and returns you to the DOS prompt.
4. This procedure assumes that you select the “Install Reflection with Telnet Support” option from the Setup main menu. Highlight this option, then press **Enter ↵**.
 5. Press **Enter ↵** to accept the source drive of the Reflection product disk, or type either A: or B:, and press **Enter ↵**.
 6. Type the destination drive and directory where Reflection will be installed and press **Enter ↵**, or press **Enter ↵** to accept the default path.

If you have not installed Reflection before, the default directory is C:\REFLECT. If you have an earlier version of Reflection already installed, the default directory may be set by the `SET REFLECT<n>=<drive:><path>` command in your AUTOEXEC.BAT file.

Note: If you install Reflection to a floppy disk, you are limited to a “Minimal Install” that provides the basic terminal emulation files and only some of the support files. ▲

7. Confirm that you have entered the proper source drive and destination, then press **(Enter ↵)** to continue the installation. You may also re-enter the source and destination if you wish to make changes.
8. Select the type of installation you want to perform and press **(Enter ↵)**. Select “Install All Files” for a complete installation. Choose “Minimal Install” if you want to install only the basic terminal emulation files.

The minimal installation is useful if you have limited hard disk space. However, it will not install some support files and will not provide complete functionality.

9. Reflection offers online help files in English, French, and German. Press **(Tab)** to move between options. Select which language(s) you wish to install with the **(Spacebar)** key, then press **(Enter ↵)**. You may optionally select all three help files, or none.

If you are performing a minimal install, you can install only one help file. If you are installing to a floppy disk, Setup skips this step.

10. Follow the on-screen instructions for inserting Reflection product disks as the Setup program copies files to your destination drive.
11. The Setup program displays several startup options that customize performance. You can choose to use or ignore any of these options:
 - ▲ **/B132** runs Reflection 2 in 132-column bit-mapped mode.
 - ▲ **/S** and **/S1** save the graphics screen image when you toggle between Reflection and a DOS application.
 - ▲ **/E** uses your PC's expanded memory, if available, to make more memory available for other PC applications and to improve Reflection's performance.
 - ▲ **/Y** provides compatibility with the DOSEDIT, CED, and NDE DOS command line editors. Do not use this option with DOS 5.0's DOSKEY.COM command line editor.

12. Confirm the startup parameters you have chosen and press **(Enter ↵)**. You may also re-enter the parameters or skip them.
13. Type the name of the directory that will store Reflection's temporary files and press **(Enter ↵)**, or press **(Enter ↵)** to accept the default directory shown on screen.

If you have not installed Reflection before, the default directory is C:\TEMP. If you have a `SET RTMP` or `SET TMP` command in your `AUTOEXEC.BAT` file, it determines the default directory.

Reflection requires a directory to store temporary files that it creates when you use *state save* and when you use the Connection Manager to manage multiple sessions.

If you are using a server version of Reflection, you should specify a location for temporary files on your local hard-drive or use a network directory that is not shared by other users. A RAM drive is recommended and increases Reflection's performance. See page 23 for more information on installing server versions.

14. Select an option for updating your `AUTOEXEC.BAT` file and press **(Enter ↵)**. You can either accept the proposed changes shown on screen, discard the changes, or save the changes to a temporary file on your root directory. You can use this temporary file (`AUTOEXEC.WRQ`) for reference in making your own changes to `AUTOEXEC.BAT` after completing the installation.

Similarly, Setup will prompt you to accept or discard proposed changes to your `CONFIG.SYS` file if the `FILES` or `BUFFERS` values need to be changed.

15. At this point you can either press any key to continue with optional keyboard mapping, or press **(Esc)** to complete the installation procedure. If you wish to remap your keyboard, continue with "Specifying Your Keyboard" next.

If you skipped keyboard mapping but selected Telnet support as part of Reflection's installation, continue with "Installing Telnet Support" on page 21.

Specifying Your Keyboard

The Setup program lets you decide whether to map your PC so that the keyboard operates like a VT keyboard. You can remap your keyboard as part of the Reflection installation, or perform remapping later by choosing "Configure Reflection" from the Setup main menu and following the prompts to the remapping screen.

1. At the screen describing the utility that creates keyboard mappings (KEYCOMP), press **[Enter ↵]** to begin viewing the various keyboards.

There are seven keyboards from which to choose:

IBM Enhanced PC
 IBM PC or XT
 IBM AT
 Digital LK250
 Digital LK450
 HP Vectra
 Key Tronic KB-5151

Only the right-hand portion of the keyboard is displayed, showing the cursor keys and numeric keypad: these are the keys to which VT terminal functions will be mapped.

2. Scroll through the keyboard screens by pressing **[N]** (next) or **[P]** (previous).

If you have an Enhanced keyboard, for instance, you should select the screen shown next:

*** REFLECTION KEYBOARD MAPPING SELECTION ***

Select the keyboard that most closely matches your keyboard

IBM ENHANCED PC
KEYBOARD:

Enhanced keyboard
with 12 function
keys on the top
(right hand
side shown here)

Keyboard 1 of 7

Insert	Home	Pg Up	Num Lk	/	*	-
Delete	End	Pg Dwn	7/Home	8/↑	9/PgUp	+
			4/<--	5	6/-->	
	↑		1/End	2/↓	3/PgDn	Enter
<--	↓	-->	0 / Ins	./Del		

PRESS

N.....To Display Next Keyboard

P.....To Display Previous Keyboard

[ENTER]..To Use Currently Displayed Keyboard

[ESC]....To Quit

RESPONSE >

Keyboard Selection

3. When your keyboard is displayed, press **(Enter ↵)**.

The Setup program checks your selection. You may be prompted to press a few keys for verification. If you wish to change your selection, press **(Esc)** and then **(R)** to restart the program.

4. In this step, you'll save the keyboard mapping to a Reflection configuration file.

If you're a new Reflection user, press **(Enter ↵)**. The keyboard mapping information is saved as R2.CFG or R4.CFG (depending on which Reflection product you are using).

If you already have a Reflection configuration file called R2.CFG or R4.CFG, press **(Enter ↵)**. If your settings are saved under a different name, press **(N)**, type the name of your configuration file, then press **(Enter ↵)**.

5. If you chose to install Reflection with Telnet support, continue with "Installing Telnet Support" next. If you did not choose the Telnet option, exit the Setup program.

Installing Telnet Support

You can install Telnet support while installing Reflection, or add Telnet support later by running Setup from the product disks and choosing "Installing Telnet Support" from the Setup main menu.

To install Telnet support, perform the following steps during the Telnet portion of the Setup procedure:

1. Type the destination drive and directory where the Telnet support files will be installed and press **(Enter ↵)**, or press **(Enter ↵)** to accept the default path C:\WRQNET. You should accept WRQNET as the directory if you use, or plan to use, other networking products from Walker Richer & Quinn.
2. Confirm that you have entered the proper source drive and destination, then press **(Enter ↵)** to continue the installation. You may also re-enter the source and destination if you wish to make changes.
3. Select the third-party TCP/IP product that you are using from the following list:

Sun Microsystems PC-NFS

Sun Microsystems PC-NFS using NIS

Novell LAN Workplace for DOS version 4.0 and higher

Ungermann-Bass Net/One for DOS
FTP's PC/TCP version 2.05 or lower
FTP's PC/TCP version 2.10 or higher
Wollongong PathWay for DOS
3Com TCP with Demand Protocol Architecture
Hewlett-Packard ARPA Services
DEC PATHWORKS for DOS (version 4.xx using TCP/IP)
Microsoft LAN Manager (version 2.10 and higher using TCP/IP)
Beame & Whiteside BWNFS Software

If you are using network software that is not one of the choices listed in the Setup program, check to see if the company redistributes FTP software. In most cases, an FTP copyright notice should appear on your network software distribution diskette, on your network software documentation, or on the screen when you load the network software. If the copyright is present, choose FTP PC/TCP when the Setup program prompts you for a TCP/IP provider.

4. Type the destination drive and directory where the Telnet support batch files will be installed and press **(Enter ↵)**, or press **(Enter ↵)** to accept the default path shown on screen.

Setup creates a STARTTEL.BAT batch file for you to run whenever you want to start Reflection's Telnet support. If you want your network software to be running whenever you use your computer, add STARTTEL to your AUTOEXEC.BAT file. Setup also creates STOPTEL.BAT, which unloads the Telnet support files.

5. Type the number of Telnet sessions you want to run at the same time and press **(Enter ↵)**, or press **(Enter ↵)** to accept the default value of 2 sessions.

Take the number of concurrent host sessions you expect to need in Reflection, and add two if you're planning to use the FTP file transfer utility. You can request as many as eight sessions—memory is allocated for each requested session, even when you're not running the maximum number of sessions. So if memory is at a premium, be conservative in estimating the number of sessions you'll need.

6. When the Telnet support installation is complete, you can exit to DOS or return to the Setup main menu to choose another Setup option.

Installing a Server Version

When you purchase a Reflection Server Pack (also known as a *server version*), you can give multiple users access to a single copy of Reflection by installing it on a network server. Reflection's server version supports up to five concurrent users. You can increase the number of concurrent users by purchasing a Reflection Add-On Pack.

Installing Reflection to a Network Server

To install Reflection to a network server, run SETUP.EXE on your product disks from any PC attached to the server. You must be logged on to the server and have "write" access to the destination drive on the server. See "Installation Procedure" on page 16 for complete instructions. When a server version is installed on a network drive, it is copied as a "read-only" file.

Once the files have been installed, the Setup program will attempt to configure the PC from which you are installing Reflection. If you intend to run Reflection from this PC, you can complete the configuration process. If this PC will not be using Reflection, press **[Esc]** and choose *Discard Changes* at appropriate points to avoid configuring the PC for Reflection.

Configuring for Individual Users

Each PC that will be running Reflection from the network server must be configured to use Reflection.

It is strongly recommended that all user-specific files—configuration and temporary files—be stored on the PC's local hard-drive or in a network directory that is not shared by other users. In this way, you can prevent one user from accidentally using a configuration or temporary file that belongs to another user.

When you choose the Save or Save As command from the File menu to save a Reflection configuration file, include the directory location (such as C:\REFLECT) for the file in the File Name text box.

Saving temporary files created by Reflection to a particular directory will be covered in the instructions that follow.

To configure individual PCs to run Reflection from the network drive, do the following:

- ▲ To ensure that Reflection runs correctly from the network drive, add the drive and path specification for the network drive where Reflection is installed to the PATH statement in your AUTOEXEC.BAT file.
- ▲ To ensure that Reflection looks for configuration files in the correct directory, add the following DOS environment variable to the AUTOEXEC.BAT file:

```
SET REFLECT<n>=<drive:><path1>
```

where <n> is the Reflection product number, and <drive:><path1> indicate the location where you have saved your Reflection configuration files.

- ▲ To ensure that temporary files are saved to the correct directory, add the following DOS environment variables to the AUTOEXEC.BAT file:

```
SET R<n>STATE=<drive:><path2><filename>
SET RTMP=<drive:><path2>
```

The R<n>STATE variable allows you to specify a name and location for the state save file if you exit Reflection using **[Alt]-[B]**. Use <drive:><path2> to specify a location and <filename> to specify a file name. The RTMP variable allows you to specify a location for temporary files that are created when you use the Connection Manager for session management. The same directory, such as C:\TEMP, can be used for both types of files.

- ▲ If you want to ensure that particular startup switches are used when you load Reflection, add the following DOS environment variable to your AUTOEXEC.BAT file:

```
SET R<n>SW=<switches>
```

For information on Reflection's startup switches, see page 29.

- ▲ Check your CONFIG.SYS file for files and buffers commands. The recommended minimum values for files and buffers are FILES=20 and BUFFERS=20. Add the commands to your CONFIG.SYS if they are not present. Increase your values to the recommended minimums if they do not meet them.

You must follow these steps for each PC that will be accessing Reflection from the network drive.

Server Version Count Utility

The utility HOWMANY.COM, provided with Reflection, displays information about your server version program. Enter `HOWMANY <Reflection filespec>` at the DOS prompt to display the maximum user count allowed by your server version and the current user count:

```
C:\>HOWMANY F:\REFLECT\R2.EXE
```

```
-----  
      ** HOWMANY **   Version 4.2  
      Reflection Server User Count Program  
      Copyright (C) 1992 Walker Richer & Quinn, Inc.  
-----
```

```
F:\REFLECT\R2.EXE
```

```
Maximum user count: 5      Current user count: 3
```

In this example, the server version program supports a maximum of five users, and three users are currently running Reflection.

If you attempt to exceed the maximum number of concurrent users allowed, Reflection displays the following message and does not run:

```
"You cannot run Reflection: the current number of users is already at  
the maximum of 5"
```

All major MS-Net compatible networking software, such as NetWare from Novell, LAN Manager, AdvanceNet, and Net/One from Ungermann-Bass, are supported by the HOWMANY utility. In the case of host-based servers and non-MS-Net compatible networks such as PATHWORKS and PC-NFS, the number of current users displayed by HOWMANY may not be accurate.

Server Versions and Windows

If you have a server version of Reflection, the utility RCOUNT.COM allows you to run multiple instances of Reflection from Windows while incrementing Reflection's server version count by only one. Load the utility before starting Windows by typing `RCOUNT` at the DOS prompt.

Support Files

The following support files are included on the Reflection disks:

- ▲ **SETUP.EXE**, the installation program, creates a working copy of Reflection and a configuration file (R2.CFG or R4.CFG by default). It can also be used to remap your PC keypad to resemble a VT terminal keypad. The remapping is stored in the Reflection configuration file. Type `SETUP /?` at the DOS prompt to see what other options are available.
- ▲ **WHATSNEW.DOC** lists changes in Reflection since the previous release.
- ▲ Reflection's online help files are named **R2<language>.HLP** and **R4<language>.HLP**, where <language> is ENG for English, FRN for French, and GER for German. For example, the French help file for Reflection 2 is called **R2FRN.HLP**.
- ▲ **DECFONT.FT**, used with both Reflection 2 and Reflection 4, contains font information for EGA, VGA, and MCGA video adapters. See "EGA Character Sets" on page 248 for a list of the DEC character sets that can be displayed, and a description of what happens when you don't use the Reflection font.
- ▲ **VAXLINK2.EXE**, **ALPHALK2.EXE**, **WRQUPLOA.MAR**, and **UPLOADVX.RCL** are used to upload the new version of **VAXLINK2**.
- ▲ **UNXLINK2.C**, **UNXXFER2.C**, **UPLOADUX.RCL**, and **WRQKERM.C** are used for UNIX file transfer. **UNIXDIR.C** is a utility that allows you to see which files are contained within a Reflection backup file. **UNIXDIR.RCL** uploads the utility to a UNIX machine.
- ▲ **KEYCOMPEXE**, **KEYMON.COM**, and other keyboard files with the extension ".KBM" are all part of keyboard remapping. **WORDPERF.KBM**, for instance, is designed for use with WordPerfect 5.0 on the VAX. It is a keyboard mapping for users who have learned WordPerfect on the PC: the way the keyboard works is almost identical.
- ▲ **123VAX.KBM** is a keyboard mapping designed for use on a PC with an Enhanced keyboard for running Lotus 1-2-3 for VAX/VMS. This mapping should be familiar to users who have learned Lotus on the PC.

- ▲ COMCHECK.COM allows you to check your serial ports. COMDRIVE.COM supports additional IRQ assignments to a COM port.
- ▲ Files with the extension “.PIF” are program information files that tell Microsoft Windows how to run Reflection. COM34WIN.EXE allows you to use COM3 or COM4 on a non-Micro Channel AT-class machine. See page 357 for more information on running Reflection with Windows.
- ▲ There are two files that provide access to LAT hosts using DECnet/PCA or PATHWORKS: LATMGR.EXE and CONMGR.EXE. CTERM support is also included.
- ▲ CRYPT.COM allows you to encrypt Reflection command files. See the *Reflection Command Language* manual for instructions.
- ▲ Translating between character sets can be done with the CHARTRAN utility or a start-up switch; see page 656.
- ▲ FILEINFO.COM helps you determine if non-ASCII characters are contained in a PC file. See page 350 for more information.
- ▲ EXAMPLES.RCL and files with the extension “.DCL” contain sample command files. There are two command files for receiving mail while you are running another PC application program in the foreground: MAIL.RCL can be used to receive VAX mail and phone messages, and A1MAIL.RCL can be used to receive ALL-IN-1 messages.
- ▲ A file called PACKR<n>.LST on each disk contains a list of the files on that disk.
- ▲ HOWMANY.COM is intended for use with the server version of Reflection. It shows how many users are currently running a given server version of Reflection, and what the maximum number of users is. Type `HOWMANY ?` for documentation on how to use the program, or see page 23.
- ▲ RCOUNTER.COM allows an accurate count of PCs running Reflection under Windows (multiple windows with Reflection on the same machine are not counted as individual copies by HOWMANY.COM). See page 358.
- ▲ WRQBACK.RCL IS a command file that guides you through the process of backing up or restoring PC files. You can run this command file with the Open File dialog box, or from the command line with the INVOKE command.

- ▲ There is a way to see which files are contained within a Reflection 2 or Reflection 4 backup file. VAXDIR.RCL is a Reflection command file that automatically uploads VAXDIR.EXE and VAXDIR.DCL as BACKDIR.EXE and BACKDIR.COM on the VAX.
- ▲ Your Reflection disk set includes an *Application Program Interface* disk. It contains libraries for C, Pascal, and BASIC, and includes a full description and examples for each API function call. The disk set also contains RCLDEBUG.EXE, a sample API program for debugging Reflection command language files. RCLDEBUG.DOC (on a separate disk) is an ASCII text file that describes how to use RCLDEBUG. See the Reflection *Advanced Topics* manual for more information about API.

After you've installed Reflection, store the original disks in a safe place.

Starting Reflection

To start your copy of Reflection, type `R2` for Reflection 2 or `R4` for Reflection 4, and press `(Enter ↵)`. You can add a switch, a configuration filename, and the name of a command file to be executed at startup.

The full syntax is:

```
R<n> [?] [<switches>] [<config filespec>] [,<command file>]
```

[?]

Type `R2 ?` or `R4 ?` to see a list of possible switches and a short explanation for each.

[<switches>]

Any number of switches can be used when you start Reflection to specify certain setup options. These options are not stored in the configuration file and are only available from the DOS command line.

/A

Forces Reflection to assume that a CGA or monochrome card is being used.

/B

Starts Reflection and immediately puts it into background if the specified or default configuration file (`R2.CFG` or `R4.CFG`) is present.

/B132

Use this switch to run Reflection 2 in *bit-mapped* mode. You can then display 132 columns and double-high, double-wide characters without buying a special video adapter. An EGA or VGA adapter is required for using this switch.

/D

Starts Reflection with all default settings. Any switches you have set up in your AUTOEXEC.BAT file (see page 40) are ignored. A state save file, if one exists, is also ignored.

/E

Tells Reflection to use expanded memory (EMS) if a LIM expanded memory driver is present. Reflection loads both program and overlay code into expanded memory, making more conventional memory available for other PC applications. If Reflection cannot find the EMS driver, the /E switch is ignored.

/GR

Available only in Reflection 4 and Reflection 2 bit-mapped, this switch forces Reflection to run in graphics mode only:

- ▲ The keystroke for toggling between graphics and text modes (**Alt-V**) is disabled.
- ▲ In Reflection 4, you cannot select the Maintain Unscaled Image check box in the Video Options Setup dialog box.

This switch should be used with JDOS/V systems running in the Japanese environment (that is, when the DOS command CHEV JP has been invoked). Without /GR, Reflection's screen is blank whenever a menu or help screen is displayed.

/I

Inhibits Reflection from loading its fonts into the video adapter when Reflection is running in text mode. This limits the characters that can be displayed to those normally available on the IBM PC and reduces RAM requirements by about 4K in Reflection 2 and by 1.5K in Reflection 4. You can still toggle into graphics mode with **Alt-V**.

/I2

Uses the standard IBM font and disables the mouse cursor. This is useful when you are running Reflection in a DOS box under Microsoft Windows.

/J

By default, Reflection rotates interrupt priorities so that datacomm is the highest. To prevent the rotation of priorities, use /J when starting Reflection.

/K0

Some PCs and memory-resident programs are incompatible with Enhanced keyboard interrupt 16 calls, and this can make Reflection “hang” when it is started. The /K0 switch forces Reflection to use its default mapping and to assume that your PC is equipped with a pre-Enhanced keyboard BIOS. Your keyboard is treated as though it were an older PC-style keyboard.

/K0 is equivalent to /K in versions of Reflection prior to 3.47.

/K1

Forces Reflection to handle keyboard interrupts via interrupt 9 and to do PC/XT-style keyboard enable (this is how the keyboard was handled before version 4.0).

/K2

Forces Reflection to handle keyboard interrupts via interrupt 9 and to do AT-style scan code locking if the machine is an AT or compatible.

Use this switch if both of the following are true:

- ▲ You are using an AT or compatible machine that does *not* have interrupt 15 support for handling keyboard interrupts (e.g., an older Vectra).
- ▲ You have a network connection to the host and you find that the cursor pad arrow keys on your Enhanced keyboard occasionally generate numbers instead of cursor movement (as if the Shift key were being held down).

If you are using an older TSR (terminate and stay resident) program, /K2 may hang your machine.

/K3

By default, Reflection operates as if /K3 were in effect. The explanation for the switch is provided here in case you have an AUTOEXEC.BAT file or command file that references it.

Forces Reflection to use interrupt 15 if available (it is on PS/2s and most ATs). Use this switch if both of the following are true:

- ▲ You are using an AT or compatible machine that *does* have interrupt 15 support for handling keyboard interrupts.
- ▲ You have a network connection to the host and you find that the cursor pad arrow keys on your Enhanced keyboard occasionally generate numbers instead of cursor movement (as if the Shift key were being held down).

/K4

Uses interrupt 15 for keyboard interrupts.

/K5

Disables Reflection's interrogation of the LK250 keyboard. By default, Reflection interrogates the LK250 keyboard to determine whether it is in DEC mode or IBM compatibility mode. With the /K5 switch, Reflection assumes the LK250 keyboard is in IBM compatibility mode. Under some conditions the interrogation may cause the PC to crash when hot-keying or shelling to DOS.

/L<n>

The switches described below force a certain type of character translation, either to a PC code page or to a customized translation table. You will probably not have to use any of the code page switches if your code page and hardware are set up correctly.

- | | |
|-------|---|
| /L860 | Translate for the Portuguese PC character set (code page 860). |
| /L863 | Translate for the French-Canadian PC character set (code page 863). |
| /L865 | Translate for the Norwegian PC character set (code page 865) |
| /L1 | Perform no translation for ASCII characters 160–255. This switch makes these characters available for keyboard mapping. This can also be accomplished after starting Reflection by typing <code>SET DISABLE-TRANSLATION-KB YES</code> on the Reflection command line. |

- /L2** Perform no translation for ASCII characters 128–255.
- /L:<filename>** Specify a <filename> to be used for character set translation with customized translation tables. This presupposes a good working knowledge of how DEC character sets work, how to map character sets, and knowledge of PC character sets and hardware. Refer to XLAT.DOC on your product disks.

/LBIG5

Provides support for the BIG5 Chinese character set. You must use BIG5 on the PC and on the host. The closest ASCII equivalents are used for line drawing characters.

/LHANG

Provides support for the Hangeul Chinese character set. You must use Hangeul on the PC and on the host. The closest ASCII equivalents are used for line drawing characters.

/M

By default, Reflection operates as if /M were in effect. The explanation for the switch is provided here in case you have an AUTOEXEC.BAT file or command file that references it.

Assumes a fast video adapter and runs Reflection with Scrolling Speed set to MAXIMUM (the default) in the Video Options Setup dialog box. Required for IBM 3270/PCs and some Zenith PCs.

/MEM:{S | M | ML | L}

This switch specifies the amount of memory Reflection will use for program overlays, where <x> can be S (small), M (medium), ML (medium-large) or L (large).

Use /MEM:S to minimize the amount of memory that Reflection uses. Use /MEM:ML to allocate enough memory to improve performance and make command files run faster. If you use the L option, all program overlays are loaded into memory and there is not enough memory to place Reflection in the background with the hot-key. See page 335 for more information on memory management techniques.

/MONO-VGA

Uses color mappings for a VGA adapter with a monochrome monitor.

/NOGR

If you are not using Reflection 4 to run host graphics, you can save approximately 30K of memory by starting with the /NOGR (no graphics support) switch.

/NOHI

By default, Reflection takes advantage of DOS 5.0 management of upper memory blocks. Use this switch to override the default.

/O

If a copy of Reflection is in memory and you want to start a second one, use /O. If you have a server version of Reflection and are using the HOWMANY utility to keep track of the number of Reflection users, run RCounter to correctly report that you are using a single copy of Reflection, not two. See "Server Versions" on page 358.

/P<n>

The built-in mouse driver for Microsoft Windows keeps control of the mouse when Reflection is running under Windows with a PIF (program information file; see page 357). When the mouse cursor appears in Reflection's display, the result can be "garbage" on the screen. This is more likely to occur with versions of Windows that precede 3.0.

The <n> identifies the IRQ (interrupt request) line that the mouse is using, so that Reflection's screen is not corrupted by the mouse. When a bus mouse is installed, the jumper block on the bus interface card is used to set the mouse IRQ. How that IRQ is set depends on the hardware you are using. In /P<n>, the value of <n> should match the IRQ value selected when the mouse was installed.

An asterisk marks the most likely setting:

Bus Mice

PC with no hard disk: 2*, 3, 4, 5, 7

XT: 2*, 3, 4, 7

PC with a hard disk: 2*, 3, 4, 7

AT: 5*, 3, 4, 7

PS/2: 12

Serial Mice

COM1: 4

COM2: 3

If, for example, you have an AT and your bus mouse is configured to use IRQ 5, start Reflection as follows:

```
C:> R2 /P5
```

/Q

Suppresses the display of the copyright screen when Reflection is started.

/R

By default, Reflection operates as if /R were in effect. The explanation for the switch is provided here in case you have an older AUTOEXEC.BAT file or command file that references /R.

This switch was used in versions prior to 3.40. It rotates interrupt priorities so that datacomm is the highest. If the Datacomm Statistics dialog box indicates that you are getting receiver overruns (lost data) during serial data communications, try using this switch. If you are using an international keyboard driver and getting overruns, this switch may solve the problem.

/S

Lets you do a "quick" save and restore of an EGA or VGA graphics image (such as in Microsoft Word) when you toggle in and out of Reflection with the hot-key. The saving of fonts is also enabled. The /S switch saves the foreground screen without using any additional memory by caching it in an unused part of EGA or VGA memory. It reduces Reflection's memory requirements by at least 1.6K.

/S1

If you find that /S does not completely save and restore an EGA or VGA graphics image when you toggle in and out of Reflection, use /S1. This switch saves your graphics image to a temporary file (see page 41 for information on the location of temporary files). It is somewhat slower than using /S, but with certain PC applications, it may be the most effective way of restoring the graphics image. Also see /Z.

/SD

Use the /SD switch to run Reflection without loading a state save file (R<n>STATE.STA), if such a file exists. Reflection will still delete the state save file unless /SK is also used. See "State Save" on page 340.

/SK

Normally, starting Reflection deletes the state save file. This can be inhibited with the /SK switch. **[Alt]-[B]** will still overwrite an existing state save file.

/W

Installs Reflection's Application Program Interface.

/X

Start Reflection with this switch if you are using 3270 FileExchange, a Walker Richer & Quinn product.

/Y

Disables interrupt 21 function 0AH handling. This switch provides compatibility with the DOSEDIT, CED, and NDE DOS command-line editors. You do not need to use this switch if you are using DOS 5.0's command line editor (DOSKEY.COM).

/Y2

Allows the hot-key to be used when DOS data areas are loaded into high memory. This provides compatibility with memory management utilities.

/Z

(VGA only.) Saves the VGA palette/video configuration when hot-keying from an application to Reflection. The palette, blink state, font size, and vertical resolution (EGA or VGA mode) are saved. (To save the font itself, use /S or /S1.) The /Z switch can be used in cases when /S cannot be used. Used in combination with /S or /S1, /Z prevents the blink/bright irregularities that can occur when you use the hot-key to toggle to an application like Microsoft Word from Reflection.

If you use Lotus 1-2-3 and an EGA, /Z will not restore your palette. This is not something that can be fixed in Reflection.

[<config filespec>]

The name of a configuration file, including its path (if necessary). Without this parameter, the default configuration file (R2.CFG or R4.CFG) is used. (To find out what the file specification for your configuration is, type `DISPLAY $CONFIG` on the Reflection command line.)

[,<command file>]

The name of a Reflection command language file. If specified, the command file is executed immediately when you start Reflection. If a configuration file does not precede the command filename, the comma is required. An individual command can be entered instead of a command filename.

Startup Switch Examples

The following are some examples of using Startup switches with Reflection:

- ▲ Type `R2` alone to start Reflection with R2.CFG (the default configuration file).
- ▲ Type `R4 /D` to start Reflection 4 with all of its original default values.
- ▲ Type `R2 /B RALPH.CFG` to start Reflection into background with the configuration file RALPH.CFG (the extension “.CFG” is recommended for Reflection configuration files).
- ▲ Type `R4 ,<command file>` to immediately execute a command file you have created with Reflection’s command language. The comma after `R4` is required if no configuration file is named. The extension “.RCL” is recommended for Reflection command language files.
- ▲ Type `R2 /I <config filespec> <command file>` to start Reflection with the standard IBM font, a configuration other than the default, and execute a command file.

Exiting Reflection

There are a number of ways to exit Reflection:

Hot-Key (Alt-(right)Shift)

Use the hot-key to keep Reflection installed in memory when you toggle to DOS. You can then run other applications as Reflection continues to run. Press the hot-key again to get back to Reflection without having to restart the program.

State Save (Alt-B)

If you do not have enough memory to run both Reflection and another DOS program, you can exit Reflection using state save.

State save removes Reflection from memory, but saves all information about your current session to a file (R<n>STATE.STA). This file is stored in either the directory from which Reflection was run, or the directory you specified with the optional SET R<n>STATE= command in AUTOEXEC.BAT. The next time you run Reflection, your session is restored from the saved file.

Exit (Alt-X)

Choosing Exit from the File menu or pressing **Alt-X** removes Reflection from memory without saving information about your current session.

By default, **Alt-X** leaves the PC logged into the host computer if a connection to the host was active. Use the Reflection command SET DISCONNECT-ON-EXIT YES to override this default.

EXIT (F8, Main Menu Labels)

The EXIT function (**F8** when the main menu labels are displayed) behaves differently, depending on whether or not Reflection has been installed in memory:

- ▲ If Reflection *has* been installed in memory—i.e., there is a “B” on the status line at the bottom of the screen—then pressing EXIT has the same effect as pressing the hot-key.
- ▲ If Reflection has *not* been installed in memory, pressing EXIT has the same effect as pressing **Alt-X**.

Setting the DOS Environment

You can use DOS SET environment commands to set the following:

- ▲ The switches to include when starting Reflection
- ▲ The directory for Reflection's temporary files
- ▲ The directory for Reflection's state save file
- ▲ The directory for other Reflection-related files

It is especially important to set a location for state save and temporary files if you are using a server version of Reflection; see page 23 for more information. These SET commands can be issued at the DOS prompt or included in your AUTOEXEC.BAT file. They are explained in detail below.

Setting the Directory for Reflection Files

To run Reflection regardless of where you are in DOS, modify the PATH command by adding the name of the Reflection directory. For example, if the Reflection files are in the directory C:\R4, add it as follows to your path:

```
PATH=C:\DOS;C:\TXT;C:\R4
```

In order to have immediate access to related support files even if your Reflection directory is not in your PATH statement, use one of the following DOS SET commands, depending on which product you are using:

```
SET REFLECT2=<drive:><path>  
SET REFLECT4=<drive:><path>
```

The <drive:><path> indicates the location of these support files if they are not in the current directory (the drive name is required):

- ▲ Reflection configuration file, R2.CFG or R4.CFG
- ▲ Reflection help file, R2<language>.HLP or R4<language>.HLP
- ▲ The Reflection font file, DECFONT.FT
- ▲ The backup and restore script, WRQBACK.RCL
- ▲ An invoked or chained command file

When a Reflection file cannot be found in the current subdirectory, Reflection tries the drive/path specified by this DOS SET command. (This command is not allowed on all PCs; Vectras running under PAM, for instance, do not support it.) If the file is still not found, Reflection looks in the directory from which it was executed.

To find out what your Reflection directory is, type `DISPLAY $REFLECT` on the Reflection command line. The drive and directory for Reflection is shown on the screen.

Adding Startup Switches

Switch information is not stored in Reflection's configuration files. If you want to ensure that a particular switch is always used when you start Reflection, use the following DOS SET environment command (you may also add it to your AUTOEXEC.BAT file):

```
SET R<n>SW=<switches>
```

The <n> is replaced by the product you are using: 2 for Reflection 2 and 4 for Reflection 4. For example, if you are running Reflection 4, and you want to suppress Reflection's copyright screen and always take advantage of Reflection's expanded memory support, use the following:

```
SET R4SW=/Q /E
```

Any number of switches can be used.

Setting the Directory for State Files

If you are planning to use Reflection's state save feature (**Alt-B**), which lets you quit Reflection and then later pick up where you left off, Reflection will by default save the state of Reflection to R<n>STATE.STA in the directory in which Reflection resides (where <n> is 2 or 4, depending on whether you are using Reflection 2 or Reflection 4).

You can specify a different filename and directory to use with the following DOS SET command (add this line to your AUTOEXEC.BAT file if you want it to be in effect whenever you start up):

```
SET R<n>STATE=<drive:><path><filename>
```


Specifying where your state file should be stored is especially important if you run Reflection on a file server. Without this command, a state file is stored on the file server in the same directory as the Reflection executable program, and other users could end up with your file. See page 23 for more information on running Reflection on a server. State save is covered in detail on page 340.

Setting the Directory for Temporary Files

This section explains which features create temporary files, and how to set up a directory in which to store them.

A temporary directory is used by the following Reflection features:

- ▲ Connection Manager uses it for saving and restoring the state of each session (R<n>*.TMP).
- ▲ Reflection's /S1 switch uses it for saving the foreground's video image to disk when Reflection is toggled into the foreground (R<n>SCREEN.STA).
- ▲ The Reflection state save feature uses the temporary directory if no R<n>STATE= environment variable has been defined.

If you're using a server version of Reflection and the Reflection Network Series, be sure to define a directory for your temporary files. Also see page 23.

The directory for temporary files must be on non-removeable media. A RAM drive is recommended and increases Reflection's performance. The Setup program offers you an opportunity to specify this directory. If you want to do this yourself, add the following DOS SET command to your AUTOEXEC.BAT file:

```
SET RTMP=<drive:><path>
```

If no RTMP directory is found, Reflection goes through the following logic to find a place to store the file(s):

- ▲ Use the TMP environment variable. Typically, this is in your AUTOEXEC.BAT file, for example: SET TMP=C:\TEMPDIR.
- ▲ Use the REFLECT<n>= environment variable described on page 39 if no TMP exists.
- ▲ Use the Reflection product path as a final possibility.

If you're troubleshooting a problem, you can use command language to find out where temporary files are being stored. Type the following on the command line and press **(Enter ↵)**:

```
DISPLAY $TEMPDIR
```

Reflection displays, for instance, D:\TMP.

Modifying CONFIG.SYS

In the root directory of the boot drive on your PC (the same location as your AUTOEXEC.BAT file), there should be a file called CONFIG.SYS. Include the following commands in the file:

```
FILES=20  
BUFFERS=20
```

The recommended minimum for files and buffers is 20. Performance may improve with buffers set higher than 20. The Reflection Setup program offers to modify these values for you if they are set too low.

Reflection State Indicators

Letters are used on the status line (or between the fourth and fifth function key labels if the labels are displayed) at the bottom of the screen to indicate a current state, such as capslock mode or insert mode. Below is a list of all possible indicators and their meanings:

- B Indicates Reflection has been installed as a memory-resident program: the hot-key has been pressed and Reflection is "in the background." See page 319 for more information.
- C Indicates capslock mode is on.
- G Indicates that Reflection is in graphics mode; the display is bit-mapped.
- H Indicates the display has been stopped. Pressing **(ScrollLock)**, **(Alt)-(ScrollLock)**, or **(Shift)-(ScrollLock)** restarts the display.

- K Indicates the keyboard is locked. Some applications lock and then unlock the keyboard; when they do so, the “K” appears temporarily. If the keyboard becomes locked for any other reason, you can unlock it by pressing **Ctrl-F2** (soft reset) or **Ctrl-F3** (hard reset).
- N Indicates numlock is on. The keypad generates numbers or VT keypad functions in this state.
- S Indicates that a compose sequence is in progress. A compose sequence consists of **Alt-F8** followed by two characters; it is used to create national characters not available on the keyboard. See page 645.

Reflection Configuration Files

When you change the values in Reflection’s Setup dialog boxes, the new values can be saved to a disk file called a *configuration file*. Any number of configuration files can be saved for different circumstances, under different filenames. The extension “.CFG” should be used for all configuration files to help distinguish them from other files.

You can specify a configuration filename at startup, as explained on page 29. You can also load a configuration file after you are in Reflection using the File Open dialog box (see page 177), or using the LOAD command on the command line (see the *Reflection Command Language* manual).

Default Configuration

The first time Reflection is run, there is no user-defined configuration, so default values are used. Dialog boxes initially show the default values for each setup parameter.

The default values for Reflection 2 are identical to the factory defaults on the VT320 terminal. For Reflection 4, the defaults match those on a VT241 terminal (the graphics terminal type default is VT340). If you have a direct connection to a VMS host, you may not need to configure Reflection. Press **Enter** once a connection has been made, and you will see the host prompt.

Default Configuration Filename

At startup, Reflection looks for a configuration filename following the DOS prompt. If you enter only `R2`, with no filename, Reflection looks in the current subdirectory for a file named `R2.CFG`. Reflection 4 looks for `R4.CFG`. If it is not found there, Reflection tries the drive/path specified by the optional DOS command for setting the Reflection directory (explained on page 39). If the file is still not found, Reflection looks in the directory from which it was executed.

Contents of a Configuration File

A configuration file contains the following:

- ▲ Information from all setup dialog boxes
- ▲ Most values set with SET parameters
- ▲ Keyboard mapping information

Every time one or more setup parameters are changed and saved to a configuration file, the current values of all the other parameters listed above are re-saved. Type `VERIFY` on the command line to view current SET parameter values; type `VERIFY CHANGED` to see how your Reflection configuration differs from the defaults.

Saving a Configuration File

Once you have made setup changes to Reflection that you want to re-use, save them to a configuration file:

1. Choose `Save As` from the File menu to open the `Save File As` dialog box.
2. Verify that the *Configuration* option is selected in the Type of Save box.
3. Type the name for the new configuration file in the File Name text box.
4. Choose `Save` to save your settings to the new configuration file.

The Reflection User Interface

This chapter describes how to use Reflection's new graphical user interface. This version of Reflection offers mouse support, allowing you to easily navigate throughout the interface by clicking on items you want to select, change, or activate. If you prefer to use the keyboard, you'll find that all of Reflection's important key-stroke shortcuts are still available, and others have been added.

If you have upgraded from an earlier version of Reflection, the appendix starting on page 659 helps you locate setup fields in Reflection's dialog boxes.

Note: If you are using a mouse with Reflection, make sure the mouse driver software included with your mouse is loaded before starting Reflection. ▲

Menus and Dialog Boxes

You can use either a keyboard or a mouse to operate Reflection. In either case, the primary controls for operating Reflection are menus and dialog boxes.

For information on a specific menu, see Section 3, "Reflection Menu Reference," starting on page 169.

If you are using a keyboard rather than a mouse, see "Keyboard Techniques" on page 50. If you are using a mouse, see "Mouse Techniques" on page 52.

Using Menus

The line across the top of the Reflection screen is called the menu bar, and contains the names of six menus.



Reflection Menu Bar

To open a menu with a mouse, simply point to the menu name and click once with the left mouse button. There are two ways to open a menu with a keyboard: using shortcut keys or using arrow (cursor) keys.

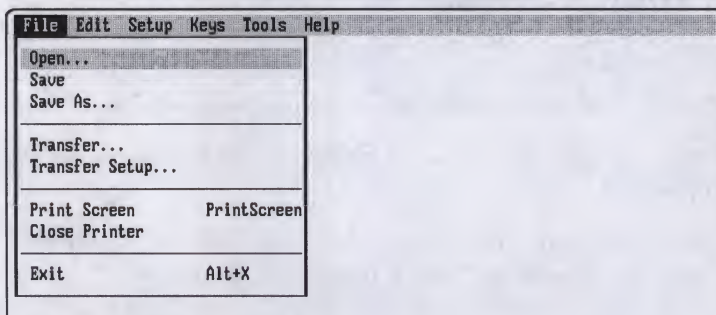
One letter in each menu name is a different color or intensity than the others; this is the shortcut key that opens the menu. To use a shortcut key, hold down **(Alt)** and press the shortcut key for the menu you want to open. For example, to open the File menu, hold down **(Alt)** and press **(F)**.

When you press and release **(Alt)**, File is highlighted on the menu bar. As an alternative to using the shortcut keys, you can use the **(←)** and **(→)** keys to highlight other menu names. Then press **(↓)** or **(Enter ↵)** to open the menu. If a menu is already open, using **(←)** and **(→)** opens and cycles through the other menus on the menu bar.

To close a menu, press **(Esc)** or click anywhere outside the menu with the mouse.

Menu Commands

The items listed on a menu are called commands. Choosing a command either takes the indicated action or opens a dialog box. If a command is followed by three dots (called an ellipsis), that means choosing it opens a dialog box. For example, the File menu has the following commands:



File Menu Commands

To choose a menu command with the mouse, point to the command and click once with the left mouse button.

To choose a menu command using the keyboard, you can either use a shortcut key or highlight the command with the **(↑)** and **(↓)** keys and press **(Enter ↵)**. As on the menu bar, a single letter in each menu command is highlighted to indicate the shortcut key.

Using Dialog Boxes

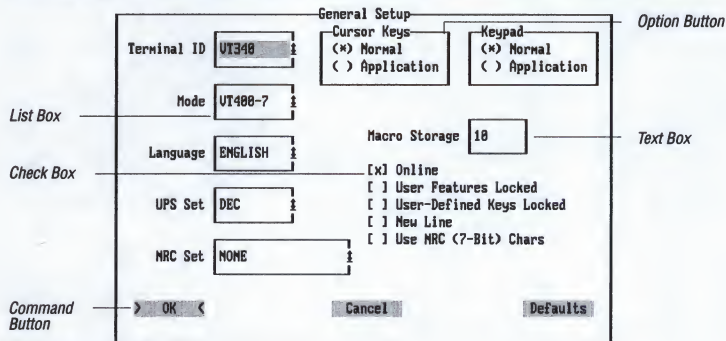
Choosing a menu command followed by an ellipsis opens a dialog box. A dialog box contains fields that control how Reflection operates. Use the **(Tab)** key to cycle forward through the fields in a dialog box, or **(Shift)-(Tab)** to cycle backward.

Every field in a dialog box has a name. Like menu names on the menu bar and command names on the menus, these field names each have one highlighted letter to indicate the shortcut key. Holding down **(Alt)** while pressing a shortcut key moves the cursor directly to that field. For example, pressing **(Alt)-(F)** in the Open File dialog box moves the cursor to the List Files of Type field. Shortcut keys also take these actions with specific dialog box fields:

- ▲ Using a shortcut key for a check box reverses the state of the check box, so that a cleared check box is selected, and a selected one is cleared.
- ▲ Using a shortcut key for a drop-down list box displays the items available in the list box.
- ▲ Using a shortcut key for a command button takes the action of the command button. For example, **(Alt)-(D)** activates the Defaults button, which restores the default settings in a setup dialog box.

Dialog Box Fields

Following is a description of the fields contained in a dialog box.



Dialog Box Fields

Command Buttons

You choose a command button to initiate an action, such as choosing OK to accept the values shown in a dialog box. The command button bracketed by “>” and “<” indicates the one that will be activated if you press .

The Defaults command button returns all fields in a setup dialog box to their default settings. Choose the Cancel button to close the dialog box without making any changes or taking any actions.

Some dialog boxes have additional command buttons (such as Save in the Save File As dialog box); these are explained in Section 3, “Reflection Menu Reference,” for each dialog box.

List Boxes

List boxes display a list of items and are identified by the up/down arrows (⇅) on the right edge of the box. Most list boxes show only one item until you open them.

To open a list box:

- ▲ Click anywhere in the list box with the mouse
- ▲ Tab to the field and press or
- ▲ Use the field's shortcut key

To choose an item from the list box, use the and keys to highlight the item, then press . You can also use the and keys to move between the first and last items in a list box, and the and keys to move through a long list box.

Text Boxes

Text boxes are fields where you can type information such as a filename or a configuration value. When you type information in a text box, you can edit that information by positioning the cursor with the and keys, and using the and keys. By default, text boxes are in overtyping mode. Press to toggle between overtype mode and insert mode.

Option Buttons

Option buttons come in groups of two or more, only one of which can be selected at a time. Using the mouse, click the option button you want to select. With the keyboard, use the arrow keys or to cycle through the option buttons.

Check Boxes

Check boxes can appear singly or in groups. Unlike option buttons, more than one or all of the check boxes in a group can be selected. Using the mouse, click a check box to select or clear it. With the keyboard, press . Pressing a check box's shortcut key moves the cursor to that check box and reverses its current setting.

Keyboard Techniques

The following table describes the keys used to move around in Reflection and to choose options and commands.

Esc	Closes a dialog box without making or activating any changes, closes a menu
Tab	Cycles forward through the fields in a dialog box
Shift-Tab	Cycles backward through the fields in a dialog box
Alt	Activates the menu bar
← or →	Performs the following actions: ▲ Selects menu names on the menu bar ▲ Selects option buttons ▲ Selects hypertext in online help topics
↑ or ↓	Performs the following actions: ▲ Displays items in drop-down list boxes ▲ Scrolls through list boxes ▲ Chooses menu commands ▲ Selects option buttons ▲ Scrolls through online help text
Enter ↵	Performs the following actions: ▲ Executes the action of the highlighted command button ▲ Executes a highlighted menu command ▲ Selects the highlighted item in a list box ▲ Jumps to the online help topic indicated by a highlighted hypertext link
Backspace	Deletes the previous character in a text box

Delete

Deletes the current character in a text box

Insert

Toggles between overwrite mode and insert mode in a text box

Home

Performs the following actions:

- ▲ Jumps to the first field in a dialog box
- ▲ Jumps to the first command on a menu
- ▲ Jumps to the first item in a list box
- ▲ Moves the cursor to the first position in a text box

End

Performs the following actions:

- ▲ Jumps to the last field in a dialog box (except text boxes)
- ▲ Moves the cursor to the end of text in a text box
- ▲ Jumps to the last command on a menu
- ▲ Jumps to the last item in a list box

PgUp

Performs the following actions:

- ▲ Pages up through the items in a list box
- ▲ Jumps to the first field in a dialog box
- ▲ Pages up through online help text
- ▲ Pages up through the online help index and topic list

PgDn

Performs the following actions:

- ▲ Pages down through the items in a list box
- ▲ Jumps to the last field in a dialog box
- ▲ Pages down through online help text
- ▲ Pages down through the online help index and topic list

Spacebar

Selects or clears a check box, cycles through the choices in a group of option buttons

Mouse Techniques

Using a mouse in Reflection is a simple procedure. On a menu or in a dialog box, simply point to the command or option you wish to choose and press the left mouse button. To close a menu with a mouse, click anywhere on the screen outside the menu.

Use the mouse actions below to select items and carry out other actions.

- | | |
|-------------------------------|--|
| Left button | Performs the following actions: |
| | <ul style="list-style-type: none">▲ Chooses a menu from the menu bar▲ Chooses a command from a menu▲ Selects an item in a dialog box▲ Sets tabs in the Tab Setup dialog box▲ Clicking and dragging the mouse highlights text on the terminal screen for copy and paste operations (see page 354) |
| Left button + [Shift] | Extends a selection for copy and paste operations |
| Left button + [Ctrl] | Selects a rectangular area for copy and paste operations |
| Right button | Clicking on a word transmits the word to the host, followed by a carriage return. This is useful in some host applications where highlighted words serve as commands. |
| Right button + [Shift] | Transmits a word to the host without a carriage return |
| Right button + [Ctrl] | Moves the host cursor position to the mouse cursor position |

Using the Keyboard

This chapter explains what PC keystrokes are used (by default) to perform VT terminal and Reflection functions, and gives an introduction on how to change the keystrokes to which these functions are assigned. More detailed instructions regarding keyboard mapping are in the Reflection *Advanced Topics* manual.

To get Keystrokes help in Reflection, choose Keystrokes from the Help menu (see page 310). Keystroke information also appears on some of the menus. When you use keyboard mapping, Keystrokes help and the keystrokes that appear on menus are updated to reflect your current mapping.

Keyboard Functions

This section describes local keyboard functions. None of the functions described here transmits characters to the host computer; for a description of keystrokes that do transmit characters to a host, see page 529, “Control Characters.” For each function the *default* keystroke is given.

Answerback **Alt-F7**

This keystroke transmits the answerback message (set in the Answerback Setup dialog box) to the host.

Beginning of line **Home**

Moves the cursor to the beginning of the current line.

Break **Ctrl-Break**

Transmits a break signal of approximately 200 milliseconds to the host computer. The length of the signal can be configured—see SET BREAK-LENGTH in the Reflection *Command Language* manual. (On earlier keyboards, **ScrollLock** is the **Break** key.)

Clear display **Alt-J**

Erases display memory from the cursor to the bottom of the screen.

Command line **Alt-F10**

Displays Reflection's command line at the bottom of the screen. Exit the command line by pressing **Esc** or by pressing **Enter** once the command line is empty.

Communications reset **Ctrl-F1**

A communications reset does the following:

- ▲ Emits a beep
- ▲ Cancels any escape sequence processing, including pass through mode
- ▲ Initializes the serial communications ports to their last activated values and clears the receive buffer
- ▲ Cancels any print operation in progress and clears the printer buffer
- ▲ Clears the keyboard buffer
- ▲ Sends an XON to the host if the Receive Pacing list box in the Advanced Datacomm Setup dialog box is set to XON/XOFF

Compose key **Alt-F8**

The two characters typed after the compose sequence are combined to form a character from the DEC multinational or Latin-1 character set as shown on page 646.

Connection reset **Ctrl-F8**

Resets a Hayes Smartmodem 1200B to its power-on state. Sets the *out 1* bit of the modem control register to 1 for at least 50 milliseconds, as described in the Hayes manual.

If you have a network connection, see "Suspend Session" on page 62.

Delete character **Del**

Deletes the character at the cursor position and moves all following characters on the line one position to the left.

When the cursor is to the left of the right margin, only the characters up to the right margin are moved left, and a space is inserted at the right margin.

When the cursor is to the right of the right margin, all characters to the right of the cursor are moved left, and the line is shortened by one column.

Disconnect **Ctrl-F10**

Disconnect functions differently depending on the type of host connection you have.

If you are connected via a serial port, Reflection lowers DTR for 2 seconds. This function disconnects a properly configured modem. Note that some modems can be configured to not respond to the disconnect signal. See "Modem Connections" on page 87.

If you are connected to a host over a network, the appropriate network disconnect signal is transmitted on this keystroke. See DISCONNECT and SET DISCONNECT-ON-EXIT in the *Reflection Command Language* manual.

End-of-line **End**

Moves the cursor to the end of the current line.

Edit menu **Alt-D**

Displays the Edit menu.

Error summary **Alt-F5**

Displays the Datacomm Statistics dialog box. See page 306 for information on using this dialog box to diagnose and correct communication problems.

Exit to DOS **Alt-X**

Exit to DOS does the following:

- ▲ Uninstalls Reflection from memory and returns to the DOS prompt.
- ▲ Erases everything in display memory.
- ▲ Leaves the PC logged in to the host computer if the connection to the host was active (provided the SET parameter DISCONNECT-ON-EXIT is set to NO, the default).
- ▲ Erases any state file (R<n>STATE.STA), unless Reflection has been started with the /SK switch (see page 36).

Compare to "Hot-key" on page 57, and "State save" on page 61.

File menu **Alt-F**

Displays the File menu.

Hard reset **Ctrl-F3**

A hard reset command does the following:

- ▲ Stops any Reflection command that is currently executing
- ▲ Stops a file transfer
- ▲ Cancels any escape sequence processing, including pass through mode
- ▲ Clears display and page memory and homes the cursor
- ▲ Clears the keyboard buffer
- ▲ Clears the UDKs
- ▲ Displays the main menu labels at the bottom of the screen
- ▲ Emits a beep
- ▲ Performs a communications disconnect, which initializes the serial communications ports and clears the receive buffer
- ▲ Sends an XON to the host
- ▲ Sets terminal setup parameters to the last activated values
- ▲ Sets Status Line in the Display Setup dialog box to its last saved (not activated) value
- ▲ Sets character sets, display enhancements, and selective erase to their default values

Help menu **Alt-H**

Displays the Help menu.

Hold screen **ScrollLock** or **Shift-ScrollLock** or **Alt-ScrollLock**

Hold screen toggles the process of taking data from the receive buffer and displaying it on the screen on and off. It depends on the receive pacing mechanism to send the XON/XOFF as needed so that the receive buffer does not overflow. (Receive Pacing in the Advanced Datacomm Setup dialog box must be set to XON/XOFF.) An "H" appears on the status line when it is active.

The keystroke **Ctrl-S** sets hold screen on, while **Ctrl-Q** clears it.

Home up/down **Ctrl-Home** / **Ctrl-End**

When you home up, the first line of display memory becomes the first row of the screen. With home down, the last line in display memory is visible on the screen. When top and bottom margins are specified, or if SET MULTI-PAGE is set to NO, homing up and down are disabled.

Hot-key **Alt-(right)Shift**

When this keystroke is used, Reflection is immediately placed in the background. Pressing it again brings Reflection back to the foreground.

Use the Hot-Key list box in the Keyboard Setup dialog box to change the keystroke that performs this action.

Insert char **Ins**

Toggles insert on and off. Characters are inserted at the cursor location, and all characters to the right of the cursor move right one column. The character at the right margin is deleted from the line to make room for the other characters to be shifted right. If the cursor is beyond the right margin when the inserted character is typed, the character in column 80 is deleted.

Keypad **NumLock**

When **NumLock** is on, the keypad is in numeric mode; an "N" is displayed on the status line. When it is off, the keypad keys are the cursor movement keys.

Keys menu **Alt-K**

Displays the Keys menu.

Main menu labels **F10**

Displays the main menu labels. You can press **F10** from anywhere in Reflection to return to the main menu labels.

Menu bar **Alt**

This keystroke activates (or highlights) the menu bar. When the menu bar is active, you can:

- ▲ Press a menu shortcut key to open a menu.
- ▲ Use **←** and **→** to move the cursor to a menu name, and then press **↓** and **Enter ↵** to open the menu.

Modem dialer **Ctrl-F7**

Displays the Modem Dialer dialog box, which can be used to establish a modem connection. See page 301.

Move down/left/right/up **↓ / ← / → / ↑**

Moves the text-mode and Tektronix cursors using the arrow keys.

Next/Prev page **Ctrl-PgDn / Ctrl-PgUp**

These functions display the next and previous pages in display or page memory. In page memory, a page consists of $\langle n \rangle$ lines in display memory, depending on the setting of the Page Memory Arrangement list box in the Advanced Display Setup dialog box:

Lines of display	Page memory arrangement
24	6×24
25	5×25
36	4×36
48	3×48
72	2×72
144	1×144

When Page Memory Arrangement is set to *AUTO* (the default), the Display Rows text box in the Display Setup dialog box determines what size each of the pages in page memory will be.

If the last line of display memory is on the screen when the “next page” function is performed, the operation has no effect. If the first line of display memory is on the screen when the “prev page” function is performed, the operation has no effect.

When SET MULTI-PAGE is *NO*, or top and bottom margins are specified, the next and prev page functions are relevant only to page memory, not display memory.

Next session **Alt-N**

Moves between network sessions without returning to the Connection Manager (or network command interpreter) prompt.

When using the Connection Manager, **(Alt)-[N]** creates a temporary “state” file (similar to the file created when you exit from Reflection with **(Alt)-[B]**). All session-specific information—a graphics image, a partially-completed form, etc.—is restored when you return to the session. See page 340 for more information about these state files.

PF keys **(F9)**

Enables the PF keys and alternate cursor keys without displaying the labels for them.

Print screen

There are a number of keystrokes for printing the screen in Reflection:

Keystroke	Description
(right)-[Shift]-[PrtSc]	Performs a DOS print screen. Available on all keyboards.
[PrtSc]	Prints the screen, except for the function key labels (if displayed). A form feed is optional (it is configured in the Printer Setup dialog box by the Auto Form Feed check box). Choosing Print Screen from the File menu is the same as pressing [PrtSc] . (Not available on an XT keyboard.)
[Alt]-[PrtSc]	Same as [PrtSc] ; available on all keyboards.
(left)-[Shift]-[PrtSc]	Same as [PrtSc] ; available on all keyboards.
[Ctrl]-[PrtSc]	Toggles printing on. From then on, anything you type or display on the screen, excluding the function key labels, is sent to the printer. A form feed is not sent. Press [Ctrl]-[PrtSc] again to turn off printing.

If you are using Reflection 4 and are in graphics mode, Reflection does a graphics print screen by default. To print text only, clear the Print Graphics check box in the Graphics Printing Setup dialog box.

Reset video (Alt)-[=]

Some PC applications can affect the video such that the Reflection screen is garbled (for example, the font and palette may be changed). Use this keystroke to reinitialize the video card and redisplay the screen. (Alt)-[=] does not attempt to restore a ReGIS or Tektronix image, just text images.

See “Display Problems” on page 482 for more information on troubleshooting.

Scroll left/right (Ctrl)-[←] / [→]

When the right margin is set beyond column 80, scrolling right brings text from beyond the right border of the screen into view. Each (Ctrl)-[→] shifts a specified number of columns off the left side of the screen, and the same number of columns onto the right side. The number of columns scrolled is specified by SET COLUMNS-PER-SCROLL (see the *Reflection Command Language* manual. When the right margin column is visible on the screen, scrolling right has no effect.

When the right margin is set beyond column 80, scrolling left brings text from beyond the left border of the screen into view. Each (Ctrl)-[←] shifts a specified number of columns off the right side of the screen and the same number of columns onto the left. When column 1 is on the screen, scrolling left has no effect.

Scroll up/down (Ctrl)-[↑] / [↓]

Scrolling up moves the text in display memory down one line and brings the previous line of text onto the top row of the screen. When the first line of display memory is in the top row of the screen, then scrolling up has no effect.

Scrolling down moves the text in display memory up one line and brings the next line of text onto the bottom row of the screen. When the last line of display memory is in the top row of the screen, scrolling down has no effect.

Both keystrokes are disabled if SET MULTI-PAGE is set to NO or top or bottom margins have been defined. If you are using page memory, scrolling has no effect on pages 2 and higher, only on the first page.

Setup menu (Alt)-[S]

Displays the Setup menu.

Softkeys **Alt-F9**

Displays the softkey labels on the screen. Use **Shift** to activate each softkey function when the softkey labels are not on the screen.

Soft reset **Ctrl-F2**

A soft reset sets the following setup values to their defaults (shown in parentheses):

- ▲ Autowrap (disabled)
- ▲ Cursor keys (normal—keys generate cursor movement)
- ▲ Insert mode (off)
- ▲ Keyboard (unlocked)
- ▲ Numeric keypad mode (keys generate numbers)
- ▲ Origin mode (off—cursor at upper left of screen)
- ▲ Text cursor (enabled)
- ▲ Character sets
- ▲ Saved cursor state (defaults)
- ▲ Active display (main)
- ▲ Character attributes (normal)
- ▲ Selective erase attribute (normal)
- ▲ Top/bottom margins (whole screen)
- ▲ Use national replacement characters (disabled)

State save **Alt-B**

You can press **Alt-B** to exit Reflection and save information about your host session to a file. The next time you restart Reflection, your state is restored. State save is useful for users who want to exit Reflection temporarily without leaving it resident in memory.

See page 340 for more information about saving Reflection's state.

Stop a command **Ctrl-C** or **Ctrl-Y**

Stops execution of a Reflection command or command file. **Ctrl-Y** can also be used to stop Reflection's proprietary host file transfer programs; you may need to press it a few times.

Suspend session **Ctrl-F8**

The effect of this keystroke depends on what network product you are using:

- ▲ When you are using a supported network that allows multiple sessions, this keystroke suspends your current session and returns you to the network prompt.
- ▲ Reflection Network Series users, version 1.1 and earlier, are returned to "CI (command interpreter) mode." The prompt appears as one of the following:

```
Local>
LOCAL>
TEL-MGR>
```

- ▲ Users of the Reflection Network Series version 2.0 and higher use **Ctrl-F8** to return to the Connection Manager (CONMGR>) prompt.

This keystroke is also the default for "Connection reset" (described on page 54), which applies to modem connections.

Toggle graphics/text modes **Alt-V**

Toggles Reflection 4 and Reflection 2 (bit-mapped) between graphics and text modes.

Toggle print logging **Ctrl-PrtSc**

Press **Ctrl-PrtSc** to route data entered at the keyboard and received from datacomm immediately to the printer. Function key labels are not sent to the printer, nor is a form feed. This keystroke toggles LOG on and off and To Prnt (to printer) on. Press **Ctrl-PrtSc** again to toggle print logging off.

Toggle Tektronix/text modes **Alt-G**

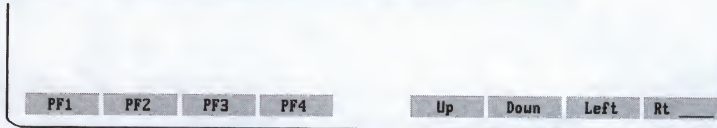
Toggles between Tektronix 4014 emulation (Reflection 4) and text modes.

Tools menu **Alt-L**

Displays the Tools menu.

PF Keys

PF keys are available via the **F1** key at the main menu labels. The PF keys are activated by pressing **F9**, but they are not displayed.



PF Keys

The four underscores on **F8** correspond to the VT LEDs (light emitting diodes). These are controlled via escape sequences: host applications can use them to indicate various conditions. When the host sends the LED escape sequence, an asterisk appears in the corresponding position, 5 through 8, of the **F8** label.

Most users map the PF functions to the numeric keypad (to simulate using a VT terminal keyboard). This can be done when you install Reflection, as explained on page 69.

VT Terminal Keys

This section shows the keystrokes for VT terminal functions in Reflection. It assumes that you have not done any keyboard mapping (when you installed Reflection or otherwise). There's a way to see what mapping, if any, is in place: press **Alt-H** in Reflection to see a series of keyboard help screens.

See "Keyboard Mapping" in the Reflection *Advanced Topics* manual if you would like to change the default keystrokes.

VT keystroke	Reflection default keystroke
F6	Alt-6
F7	Alt-7
F8	Alt-8
F9	Alt-9
F10	Alt-0
F11	Alt-Q
F12	Alt-W
F13	Alt-E
F14	Alt-R
F15	Alt-T
F16	Alt-Y
F17	Alt-U
F18	Alt-I
F19	Alt-O
F20	Alt-P

User-Defined Keys

In the following table, the Reflection default “**Shift**” is (left)**Shift**.

VT keystroke	Reflection default keystroke
Shift-F6	Alt-Shift-6
Shift-F7	Alt-Shift-7
Shift-F8	Alt-Shift-8
Shift-F9	Alt-Shift-9
Shift-F10	Alt-Shift-0
Shift-F11	Alt-Shift-Q
Shift-F12	Alt-Shift-W
Shift-F13	Alt-Shift-E

VT keystroke**Shift-F14****Shift-F15****Shift-F16****Shift-F17****Shift-F18****Shift-F19****Shift-F20****Reflection default keystroke****Alt-Shift-R****Alt-Shift-T****Alt-Shift-Y****Alt-Shift-U****Alt-Shift-I****Alt-Shift-O****Alt-Shift-P**

Editing Keys

The VT300 series keyboard has a block of six editing keys. Reflection simulates these functions as follows:

Find **Alt-7**Insert Here **Alt-8**Remove **Alt-9**Select **Alt-4**Prev Screen **Alt-5**Next Screen **Alt-6**

Compose Key

Use the key combination **Alt-F8** to simulate the **Compose** key. This sequence is used to produce multinational characters; see page 645 for instructions on how to do this. The compose key can be disabled; see page 271 for set up information.

Keyboard Mapping Overview

Each Reflection or VT terminal keyboard function—such as “open the File menu labels”, “go to the command line”, or “PF1”—has a default keystroke. You can *map* the keyboard so that these functions are performed by different keystrokes. Mapping gives you a lot of flexibility:

- ▲ Take advantage of keyboards with non-standard layouts and features
- ▲ Attach commonly used strings of text and control codes to a keystroke
- ▲ Move a Reflection function to another keystroke
- ▲ Disable a Reflection function, such as hard reset or exit

Keyboard mapping information is stored in Reflection configuration files. You can store different keyboard maps in various configuration files, then load the appropriate configuration when you change host computers or applications.

The most common mapping in Reflection makes the PC's keyboard operate more like a VT keyboard. This can be done with a supplied mapping file, either through the Setup program or by running the mapping compiler with a special switch; see page 69 for details.

In the following example, **[Alt]-[A]** is mapped so that it displays the File Transfer dialog box.

Using an ordinary text editor,
create a new file called
DEMO.KBM

The first line of the file is your
keyboard-ID. For example:

```
keyboard-id = enhanced
```

Enter any number of keystroke definitions. The
simplest keystroke definitions follow this pattern:

Keystroke = String

```
alt shift g = "Good morning"
```

Keystroke = Function

```
alt lshift a = command-line
```

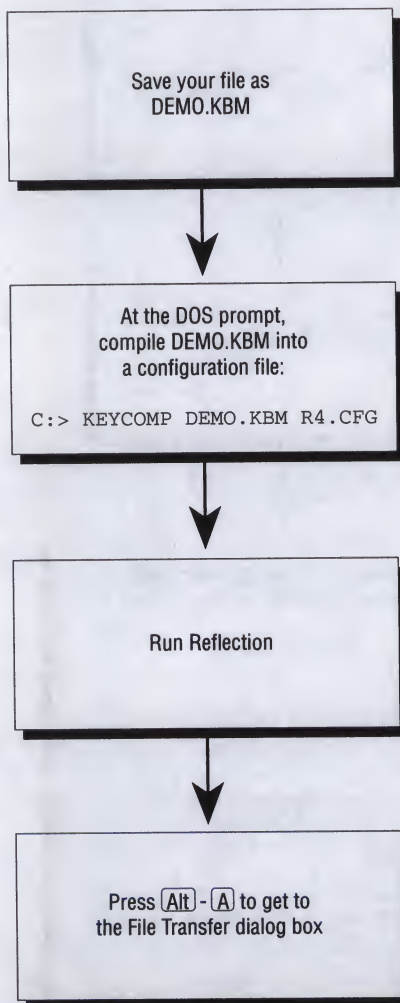
A keystroke definition can combine
strings and functions:

```
ctrl shift n = next-session "^W"
```

For example, let's define the keystroke "alt a"
to bring up the Reflection File Transfer dialog box:

```
keyboard-id = enhanced  
alt a = file-xfer-screen  
;"file-xfer-screen" is a  
;Reflection function name.  
;Comments (like this one)  
;are preceded by a semicolon
```

(continued on next page)



Keyboard Mapping Process (continued)

Supplied Mapping Files

If you would like to change the way your keyboard is mapped, the easiest (and recommended) method is to use a *supplied* keyboard mapping file. Several source files for defining alternate keyboard mappings are provided on the Reflection disks. You can make copies of these files and use them to remap your keyboard, or just look at them for examples. None of the mapping you do is in effect when you are on the Reflection command line: the editing and cursor keys will work as usual.

The “.KBM” extension identifies keyboard files. If you create your own files, this extension is recommended.

Mapping VT Functions During Installation

In Reflection’s install program, you can opt to remap VT functions by responding to a series of prompts. Type `KEYCOMP /S` at the DOS prompt to be prompted through the same process.

There is a supplied mapping file for each of the most common keyboards. The mapping is intended to make the PC keyboard simulate a VT100 or VT300 series keyboard. The filename is an abbreviation of the corresponding keyboard type followed by a sequence number.

Use the table below to choose a file:

Filename	Keyboard type
ENH3.KBM	Enhanced
AT1.KBM	AT
PC1.KBM	PC/XT
VEC1.KBM	HP-Vectra
KB1.KBM	KB-5151
LK250.KBM	Digital’s LK250
LK450.KBM	Digital’s LK450
NOTENH.KBM	Non-Enhanced

For example, if you have an IBM AT with the Enhanced 101/102 keyboard, you should select ENH3.KBM as your preferred mapping. Copy the file to another filename and work with the copy—this way you can always compare your version

against the original if you make changes to the file. It can be viewed and changed in any PC text editor that can create ASCII text files.

See “Customizing Your Keyboard” in the *User Guide*. Also see the *Reflection Advanced Topics* manual for a series of figures showing the supported keyboards.

Mapping for WordPerfect

The keyboard mapping file WORDPERF.KBM is designed for use with WordPerfect 5.0 on the VAX and an Enhanced keyboard. The keyboard mapping will be familiar to users who have learned WordPerfect on the PC; keyboard function is almost identical.

See the comments at the beginning of WORDPERF.KBM for details on how to use the mapping file. If you are using a version of WordPerfect that predates version 5.0, or if you are not using an Enhanced keyboard, check the Reflection bulletin board service for other mapping files. The BBS number is listed on page iii of this manual.

Mapping for Lotus 1-2-3 for VAX/VMS

The keyboard mapping file 123VAX.KBM is designed for users who have learned Lotus 1-2-3 on a PC and want to be able to use the same keystrokes when they run Lotus 1-2-3 for VAX/VMS. The mapping becomes part of your Reflection configuration file and does the keystroke “translation.”

This mapping file is intended for use on a PC with an Enhanced keyboard. To keep your Lotus mapping and your standard mapping separate, follow these steps:

1. Copy your R2.CFG or R4.CFG configuration file to 123VAX.CFG.
2. Use KEYCOMP to compile 123VAX.KBM into 123VAX.CFG.
3. Run Reflection and start 1-2-3 for VAX/VMS.
4. Choose Command Line from the Tools menu (or press **[Alt]-[F10]**) to display Reflection’s command line.
5. On the command line, type `LOAD 123VAX.CFG`, and press **[Enter]**.
6. Use 1-2-3 for VAX/VMS. Remember to ignore the Numlock and ScrollLock lights on your keyboard, observing instead the NUM and SCROLL indicators that Lotus displays in the lower right corner of the screen.

After exiting Lotus 1-2-3 for VAX/VMS, you'll want to load your standard keyboard map:

1. Choose Open from the File menu to display the Open File dialog box.
2. Verify that the *Configuration* option is selected in the List Files of Type box.
3. Choose the configuration file containing your standard keyboard map (such as R2.CFG or R4.CFG) from the Files list box, then choose Load.

Default Mapping

The file DEFAULT.KBM, on one of the support disks, lists the default keystrokes and function names for Reflection. It is not meant to be compiled: it is for documentation only. It shows you how the keyboard behaves if you do not make use of the keyboard mapping feature. You can use portions of this file as a starting point for your own mapping files. (If you use a part of this file, delete the semi-colon at the beginning of each line: otherwise the line is treated as a comment.)

Note: If the file is not in your Reflection directory, copy it from your product disks (type `SETUP /D <drive:>DEFAULT.*` at the DOS prompt to decompress just this file). ▲

Getting Connected

This section helps you determine whether your PC has the proper cabling to establish a connection to the host. Serial connections—direct and modem connections via a communications port on your PC—are discussed first, followed by network connections on page 97.

Connections to hosts other than VMS systems are covered on page 163.

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Direct Connections

Reflection's emulation defaults are set for a VAX or Alpha host computer running under VMS via direct connection at 9600 baud, using the COM1 serial communications port of the PC.

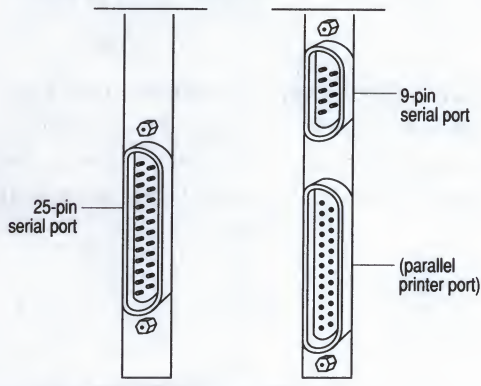
If you are communicating serially with a VMS host, chances are that the only parameter you will have to change is baud rate, which is discussed on page 223. Even if your host is not a VMS system, the default communications values are probably correct. Work your way through this chapter and try to connect before assuming you need to reconfigure for communications.

Locating the Serial Ports

To make a serial connection to another computer, the PC needs a serial communications port, known as an asynchronous communications adapter. This port is part of the standard package on the IBM Personal Computer AT and many of the IBM-compatible computers.

To check your cable connection, look at the cable that goes to the host computer. It should be plugged into a 9-pin or 25-pin male port in the back of your PC.

The serial ports look like this:

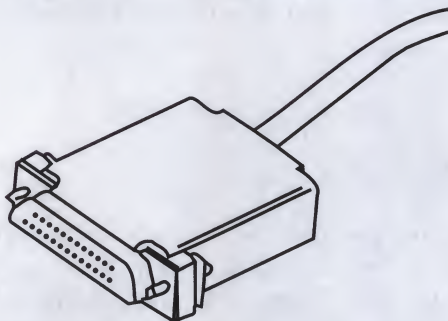


IBM 25-Pin and 9-Pin Serial Ports

An alternative to the asynchronous communications adapter is an internal modem card that contains both a modem and a receiver/transmitter. This card usually has one or two jacks for plugging directly into a telephone circuit. It may also have a 25-pin connector, which provides the additional option of direct connection to the host computer.

Cables for a Direct Connection

For a direct connection, use a standard RS-232 cable with a female connector.

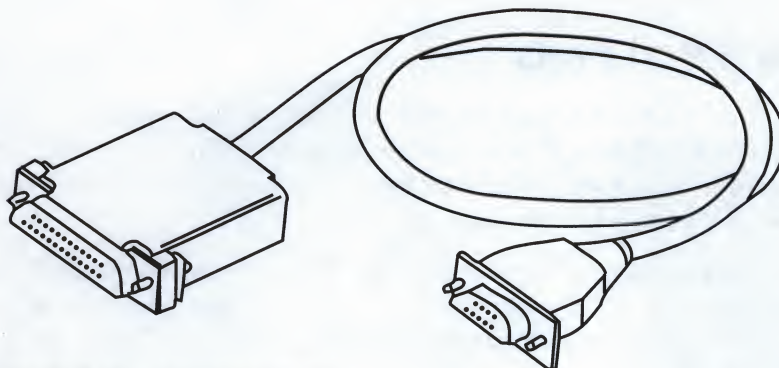


RS-232 25-Pin Serial Interface

Reflection requires only three pins in the RS-232 25-pin serial interface:

- | | |
|-------|---------------|
| Pin 2 | Transmit data |
| Pin 3 | Receive data |
| Pin 7 | Signal ground |

It is a good idea to also include pin 1, the protective ground line. Other pins may be present, but they are ignored (unless Reflection is configured to use them; see “CTS Required” and “DSR Required” on page 228). For most host computers, do not cross pins 2 and 3; they have already been crossed at the point of connection to the host.



RS-232 25-Pin to 9-Pin Serial Interface

The AT 9 to 25-pin adapter cable crosses pins 2 and 3 once due to the difference in how the AT 9-pin interface is wired. To use the AT's serial port you probably need a 9 to 25-pin adapter cable with the following configuration:

RS-232 AT Cable Wiring Scheme

25-Pin Pin #	9-Pin Pin #	Signal Name
8 -----	1	Data carrier detect (DCD)
3 -----	2	Receive data
2 -----	3	Transmit data
20 -----	4	Data terminal ready (DTR)
7 -----	5	Signal ground
6 -----	6	Data set ready (DSR)
4 -----	7	Request to send (RTS)
5 -----	8	Clear to send (CTS)
22 -----	9	Ring indicator

When the connection to the host is made via direct-connect cable and Reflection is run, the PC is ready to be used as a terminal.

If you are configuring Reflection to communicate with a VM/370 or MVS/TSO, which is described on page 163, you may require modem control in your cabling (DTR, DSR, RTS, and CTS).

Multiple Serial Ports

The IBM PS/2 Micro Channel machines have up to eight communications ports (COM1–COM8), and AT machines have up to four. The XT can only have two. Reflection can use any one of these for communicating with a host computer, provided it is generating the correct interrupts.

Only one port can communicate at a time. The other serial ports can be used to drive serial devices, such as a printer. If your PC has more than one serial port, you must ensure that they are configured correctly and that the IRQs do not conflict with each other.

Serial ports are found on the following boards:

- ▲ IBM Asynchronous Communications Adapter
- ▲ Add-on boards, such as the AST Six-Pack
- ▲ Internal modems such as the Hayes Smartmodem 1200B
- ▲ IBM serial/parallel adapter

Use the COMCHECK utility to see what communications ports and IRQ lines are being used. COMCHECK is described on page 83.

PS/2 Machines

The serial port choices COM5 through COM8 appear in the Connection Type list box only for PS/2 machines with Micro Channel architecture. PS/2 serial boards are not configurable.

IRQ Line Defaults: PS/2

COM Port	IRQ Default
COM1	IRQ4
COM2	IRQ3
COM3–8	IRQ3

AT and Compatibles

On AT-class machines, Reflection's Connection Type list box supports the COM<n>-IRQ<n> combinations shown in the following table. For many internal modems, the default IRQ choice for a COM3 port is IRQ4; for a COM4 port, IRQ3 is often the default. These connection types are among those listed in the Datacomm Setup dialog box described on page 221.

If you are using an IRQ setting that is not included in the following table, COM-DRIVE is a utility that allows Reflection to associate different IRQs with the COM ports; see page 85 for information. In any case, make sure that no two devices are using the same IRQ line.

IRQ Line: ATs and Compatibles

COM Port	IRQ	I/O Base Address
COM1	IRQ4	3F8h
COM2	IRQ3	2F8h
COM3	IRQ2	3E8h
	IRQ4	3E8h
	IRQ5	3E8h
	IRQ10	3E8h
COM4	IRQ2	2E8h
	IRQ 3	2E8h
	IRQ5	2E8h
	IRQ11	2E8h
COM5-8	Not applicable	

Checking Serial Ports: COMCHECK

A utility program called **COMCHECK** is provided on the Reflection disks to let you check your serial ports. It is a diagnostic tool that tells you how your COM ports are configured. The default IRQ line each COM port uses is listed in the tables above.

The command syntax is as follows:

```
COMCHECK [/F] [/H] [/V]
```

Type `COMCHECK` without parameters to check all of your PC's serial ports.

The parameters are as follows:

- /F `COMCHECK` should be run before you run Reflection or Windows. If you have to "force" `COMCHECK` while Reflection or Windows is running, type `COMCHECK /F` at the DOS prompt.
- /H Displays the syntax above.
- /V Provides a "verbose" description of the COM ports checked, covering the hardware type and the interrupts generated. It also shows the results from the tests that are used to determine if a COM port is properly installed.

If you have more than one serial port in your PC and the `COMCHECK` program only recognizes one COM port (or none), find out if the boards are set up according to the documentation supplied with them. You may have to open your PC and look at how they are set up. There are usually two jumper pins on these boards that can be adjusted to make the serial port on the board function as COM1–COM4 (PS/2 serial boards are not configurable). Problems occur if boards have conflicting configurations.

Check the following:

- ▲ The IRQ line. Check the setting on the boards for the jumper that sets the interrupt request line. See page 83 for a list of the default IRQ line each COM port uses and how to configure for a different line.
- ▲ The I/O base address. Check the setting on the boards for the jumper that sets the I/O port base address. See the table on page 83 for the base address that corresponds to each IRQ.

`COMCHECK` does not support the COM ports set via the `COMDRIVE` utility, described in the following section.

Note: Simple communications programs that use *polling* may work even if the IRQ line is incorrectly configured. However, Reflection is *interrupt driven* and does not work unless the IRQ and jumpers are correctly configured. ▲

Configurable IRQs: COMDRIVE

COMDRIVE is a TSR (terminate and stay resident) program that allows Reflection to associate different IRQs with the COM ports. You can, for example, assign an IRQ of 7 or 8 to COM3. COMDRIVE must be run before Reflection is started; it uses less than 3000 bytes of memory.

To use COMDRIVE, change Connection Type in the Datacomm Setup dialog box to MNP-COM<n>, where <n> corresponds to a COM device name. This value allows access to the COM and IRQ settings assigned by COMDRIVE.

The syntax for COMDRIVE is as follows:

COMDRIVE /<n> [/<m>] [/X<o>] [/U]

- /<n> The first parameter refers to a COM device name. For example, COMDRIVE/2 refers to COM2; choose MNP-COM2 from the Connection Type list box.
- /<m> This optional parameter refers to the IRQ line. You must include this parameter with COM3 and COM4 on XT-class machines.
- /X<o> Optional parameter for specifying the I/O base address.
- /U To uninstall the driver, use COMDRIVE /U.

For example:

- ▲ To use COM1 with an IRQ of 3, type COMDRIVE /1/3.
- ▲ Type COMDRIVE/1/3/X3F08 to use COM1 with an IRQ of 3 and an IO base address of 3F08.
- ▲ You can add the COMDRIVE command to your AUTOEXEC.BAT file or a batch file that starts Reflection.

What is the purpose of the document?

The purpose of the document is to provide information about the project and to ensure that all stakeholders are aware of the project's progress and any changes that may occur.

The document is intended for all stakeholders involved in the project, including the project manager, team members, and external stakeholders.

The document is a living document that will be updated as the project progresses and new information becomes available.

The document is a key tool for project communication and collaboration, and it is essential for the success of the project.

The document is a central point of reference for all project-related information, and it is important to keep it up-to-date and accurate.

The document is a critical component of the project management process, and it is essential for ensuring that the project is completed on time and within budget.

Modem Connections

There are two types of modems you can use to connect the PC to a host computer:

- ▲ An external modem
- ▲ An internal modem (an interface card inside the PC)

By default, Reflection is set to communicate with the host at the rate of 9600 baud. When connecting to the host via modem, you may need to reconfigure the baud rate in the Datacomm Setup dialog box. The Hayes Smartmodem automatically detects the baud rate when you type, so you do not need to reconfigure the baud rate even when it differs from the default setting.

For information about configuring automated modem dialers, see page 303.

There are several types of modems, and their operations can vary significantly, so be sure to read your modem's documentation before using Reflection. The information on page 480 provides some troubleshooting information for modem communications.

External Modem Wiring Connections

Connect an external modem to the PC serial port using an RS-232 modem cable. The following table shows the proper wiring scheme for this cable.

RS-232 External Modem Cable Wiring Scheme

Serial Port Pin #	Modem Pin #	Signal Name
1 -----	1	Protective ground
2 -----	2	Transmit data
3 -----	3	Receive data
4 -----	4	Request to send (RTS)
5 -----	5	Clear to send (CTS)
6 -----	6	Data set ready (DSR)
7 -----	7	Signal ground
8 -----	8	Data carrier detect (DCD)
20 -----	20	Data terminal ready (DTR)

Modem States and Resets

A modem is always in one of two functional states: local command state or online state.

In the local command state, the modem expects to receive its commands locally from the PC, such as *dial the phone* or *hang up*. This state is invoked when you first power on the modem.

In the online state, the modem transmits data from Reflection to the host via the phone line, and passes incoming data from the phone line to Reflection.

You can switch between the two modem states using a special sequence of characters, known as an *escape code*. The default escape code for the Hayes Smartmodem is `+++`. Use the `[+]` key in the upper keyboard row (`[Shift]-[=]`), not the keypad `[+]` key, when you enter the code. A pause of one second is required before and after the escape code.

Resetting the Modem

If you're experiencing problems, resetting the modem often helps. To reset an internal or external modem:

- ▲ Choose Modem Dialer from the Tools menu, then choose the Reset command button in the Modem Dialer dialog box.

If you prefer to use modem commands to perform the reset:

- ▲ Put your modem in local command state by typing `+++`, then use one of the following commands:

Modem Setup	Command
1200 baud	ATZ (Turning off a 1200 baud modem also resets it.)
2400 baud	AT&F
Internal	Enter <code>RESETCOMM</code> on the Reflection command line, or press <code>[Ctrl]-[F8]</code> . This resets the internal modem card by setting the <i>out 1</i> bit of the modem control register to 1 for about 50 milliseconds.

Hanging Up the Modem

Determine whether the host computer breaks the phone connection automatically when you log out.

If the connection is not broken, choose Modem Dialer from the Tools menu, then choose the Hang Up command button in the Modem Dialer dialog box. Alternatively, use a procedure from the following table (which one depends on your modem setup):

Modem Type	Procedure
Hayes External or Internal	Pause 2 seconds and type +++ Pause for OK and type ATH
Hayes Internal	Ctrl - F8
External or Internal	Ctrl - F10
External	Power off
Internal	Unplug jack

If your modem is configured to disconnect when the data terminal ready (DTR) signal is dropped, you can disconnect your modem with **Alt**-**X**. The SET parameter DISCONNECT-ON-EXIT must be set to YES.

Using High-Speed Modems

High-speed modems operate most efficiently when Reflection's baud rate is configured higher than the modem carrier speed since the modem is performing data compression. The high-speed modem works faster since it accepts data at a faster rate (for example, 19200), compresses it, then transmits the information (at possibly 14400) to the receiving modem, where the data is then decompressed and sent (at 19200) to a forum like a bulletin board.

Note: Although it is unlikely that you'll connect to a host at a speed as high as 14400, this is a practical baud rate for connecting to an electronic service such as a bulletin board. ▲

Control standards for high-speed modems (some 2400s and all 9600s) require flow control to ensure data is not lost during transfer sessions between computers. For example, the Microcom MNP modems default to XON/XOFF flow control with the terminal (PC) or the host computer. Because XON/XOFF causes problems with some hosts and many file transfer protocols, there is another flow control standard that has emerged and is supported by Microcom and others.

This alternative form of hardware flow control uses the RTS and CTS pins to control data flow. If you are using a high speed modem that supports RTS/CTS flow control, make the following changes in the Advanced Datacomm Setup dialog box:

Receive Pacing list box	<i>HARDWARE</i>
Transmit Pacing list box	<i>HARDWARE</i>
CTS Required check box	<i>Cleared</i>
DSR Required check box	<i>Cleared</i>

You must also configure the modem to use this protocol.

Connecting to the Host Using a Modem

If you have a Hayes Smartmodem (or similar product), use the following steps to establish a modem connection to the host:

1. Turn the modem on and start Reflection.
2. In the Datacomm Setup dialog box, select the serial port your modem is using in the Connection Type list box (see the information on internal and external modems earlier in this chapter).
3. Set the Baud Rate list box to match the baud rate of your modem, then choose OK.
4. If you are connecting to the host over a high-speed modem, choose *HARDWARE* in the Receive Pacing and Transmit Pacing list boxes in the Advanced Datacomm Setup dialog box. This option uses the RTS and CTS pins on the RS-232 serial cable to control data flow; see "Using High-Speed Modems" on page 89 for more information.

5. Verify that the Online check box is selected in the General Setup dialog box.
6. You can dial the modem using modem commands (explained next). Or, you can automate dialing by using Reflection's *modem dialer*. Choose Modem Dialer from the Tools menu to configure or use an automated dialer; this is described on page 303.
7. Once you are connected to the host, login as you would normally.
8. If the above steps resulted in a modem connection to the host, choose Save from the File menu to save these options to a Reflection configuration (.CFG) file. Configuration files are described on page 180.

When you are finished, log out. Some host systems drop the carrier signal when you log out; the modem responds with "OK." If your system doesn't automatically drop the signal, the dialer will hang up by transmitting `ATH`.

Modem Command Summary

The following table is a summary of commands that can be used with a 2400 (and higher) baud Hayes-compatible modem. Your modem manual will have more detail about these commands: they are listed here for your convenience and should not be confused with Reflection commands.

Not all modems support these commands: refer to your modem manual to see which ones are valid for you. The rules for entering these commands are as follows:

- ▲ If a command accepts a parameter and you do not enter one, the modem assumes a zero (`0`) value.
- ▲ The command line should be 40 characters or less. Spaces are not counted. You can use hyphens and parentheses when you enter a telephone number—but they are counted and take up space on the command line.
- ▲ The maximum number of digits that can be dialed in a command is 38.
- ▲ Most modems sold today accept commands in either lowercase or uppercase, while older modems accept commands in uppercase only. Consult your modem manual to find out what your requirements are.

A carriage return (**Enter** ) executes each of the commands in the following table, with the exception of **+++**. The character after each "AT" (Attention) can be combined with other such characters. For instance, all three of the following modem commands are valid:

ATE1 Turn echo on
AT&W Store status registers
ATE1&W Turn echo on and store status registers

Command	Parameters	Description
+++	<none>	Escape from online to "OK" prompt; pause one second before typing and do not follow with a carriage return
A/	<none>	Repeat previous command
AT	<none>	Attention
ATA	<none>	Manually answer incoming call
ATB<n>	<n>=0 <n>=1	CCITT V.22 (international) Initiate calls using Bell 103/212a at 1200 bps
AT&C<n>	<n>=0 <n>=1	DCD always high DCD follows carrier detect
ATD<number>	<none>	Dial <number>; <number> can include special characters, which are explained on page 95
ATDP<number>	<none>	Dial <number> using pulse dial; <number> can include special characters, which are explained on page 95
ATDS	<none>	Dial previously stored number
ATDT<number>	<none>	Dial <number> using tone dial; <number> can include special characters, which are explained on page 95

Command	Parameters	Description
AT&D2	<none>	Enable disconnect
ATE<n>	<n>=0	No echo in command mode
	<n>=1	Echo enabled
AT&F	<none>	Reset modem to factory defaults
AT&G<n>	<n>=0	Guard tone off
	<n>=1	Guard tone, 550 hz on
	<n>=2	Guard tone, 1800 hz on
ATH<n>	<n>=0	Hang up, immediate (go on-hook)
	<n>=1	Pick up (go off-hook)
ATI<n>	<n>=0	Request product code
	<n>=1	Request checksum
	<n>=4	Display registers
ATL<n>	<n>=1	Speaker volume low
	<n>=2	Speaker volume medium
	<n>=3	Speaker volume high
AT&L1	<none>	Leased line operation
AT&k<n>	<n>=0	Disable local flow control
	<n>=1 or 3	Enable RTS/CTS local flow control (hardware handshaking)
	<n>=2 or 4	Enable XON/XOFF local flow control
	<n>=5	Enable transparent XON/XOFF flow control
ATM<n>	<n>=0	Speaker always off
	<n>=1	Speaker on until carrier is detected
	<n>=2	Speaker always on
	<n>=3	Speaker on during carrier detect
ATO<n>	<n>=0	Return online
	<n>=1	Return online and retrain (2400 baud)
AT&P<n>	<n>=0	Set dialing mode to pulse (rotary), US timing
	<n>=1	Set dialing mode to pulse (rotary), UK timing

Command	Parameters	Description
ATQ<n>	<n>=0	Do not send result codes
	<n>=1	Send result codes
ATS<n>?	<none>	Status check of register <n>
ATS<r>=<n>	<n>=0-16	Set register <r> to <n> (see table below for register descriptions)
AT&S<n>	<n>=0	DSR always on
	<n>=1	DSR per V.22bis (RS-232 specification); assert DSR signal before handshake only
	<n>=2	Assert DSR after negotiation, but before CONNECT nnnn result code is sent to the DTE
AT&T<n>	<n>=0	Exit test mode
	<n>=1-8	Enter test mode
ATV<n>	<n>=0	Result codes as digits
	<n>=1	Result codes in words
ATW	<none>	Wait for dial tone
AT&W	<none>	Store status registers*
ATX<n>	<n>=0	Gives result codes indicating connection, no carrier, and ring detection
	<n>=1	Gives result codes indicating connection speed
	<n>=2	Gives result codes indicating connection speed and dial tone detection
	<n>=3	Gives result codes indicating connection speed and busy signal detection
	<n>=4	Gives result codes indicating connection speed, and dial tone and busy signal detection
ATY<n>	<n>=0	Ignore breaks (long space disconnect disabled)
	<n>=1	Enable breaks (long space disconnect enabled)
ATZ	<none>	Reset ("zap") modem to power-on values
AT&Z<number>	<none>	Store telephone number; <number> can include special characters, explained below

* Use this command with caution: some modems use non-volatile memory for storage, allowing only a limited number of writes before the modem stops functioning.

The following commands are used for the `<number>` parameter with `ATD` and `AT&Z`:

ATD and AT&Z Commands

Command	Parameters	Description
/	<none>	125-millisecond pause in dialing
,	<none>	2-second pause in dialing
;	<none>	Return to command mode
!	<none>	Flash (on-hook, off-hook) for half of a second

The command `ATS<r>=<n>` sets register `<r>` to `<n>`. Use `ATS<r>?` to display the contents of register `<r>`. The following table lists the possible values of `<r>`:

<r>	Modem Register Description
0	Auto answer, number of rings
1	Count number of rings
2	Escape code character (<n> is an ASCII decimal value)
3	Carriage return character (<n> is an ASCII decimal value)
4	Linefeed character (<n> is an ASCII decimal value)
5	Backspace character (<n> is an ASCII decimal value)
6	Wait time before dialing
7	Wait time for carrier detect
8	Duration of pause while dialing
9	Carrier response time (<n> is the amount of time)
10	Wait time before disconnect
12	Escape guard time (<n> is the amount of time)
14	Option register status
16	Self-test register
18	Self-test timer value
21	Option register
22	Option register
23	Option register
25	DTR delay value
27	Option register

Examples:

ATZ	Reset modem to power-on values
AT&F	Reset modem to factory defaults
AT&D2	Enable disconnect
ATDT<number>	Tone dial
ATDP<number>	Pulse dial
ATD<number1>W<number2>	Dial <number1>, wait for secondary dial tone, and then dial <number2>
ATH0	Hang up
ATS0=1	Enable modem to answer on first ring
ATS0=0	Disable modem answer
ATDT1,P(800)555-1212	Tone dial 1, pause, then pulse dial the remainder of the number

Refer to your modem documentation for other commands. A useful command for troubleshooting on a Hayes modem, for instance, is `AT&V`. This lets you see your current configuration, user profiles, and stored telephone numbers.

Reflection command language can be used in conjunction with modem commands. An example of this is `DIALHOST.RCL`, which is included on your Reflection disks: it is the command file that is invoked when you use the dialer (discussed on page 90). Other command language examples, such as using a calling card to dial, are available on the `WRQ` bulletin board (see page iii for the BBS phone number).

Overview of Network Connections

Reflection offers support for communicating over local and wide-area networks. This chapter explains how to use Reflection with each of the networks it supports.

The basic steps required to use Reflection over a network connection are:

1. Install and configure the appropriate network software on your PC.
For information on specific networks, see the discussion beginning on page 99. Each network is described in alphabetical order by Connection Type (the table on the following page shows which Connection Type is used for each network).
2. Load your network software into memory.
3. Start Reflection.
4. In the Basic Setup or Datacomm Setup dialog box, select your network Connection Type and choose OK.

If the message "Communications driver software not found" appears, your network software has not been properly loaded.

5. Configure Reflection for your network connection according to any additional information given for your Connection Type.

For general information on managing your network sessions, see "Session Management" on page 109. Some session management information is also provided when discussing specific Connection Types. The following table shows which Connection Type is used for each network supported by Reflection:

Supported Network	Connection Type
AT&T Starlan	AT&T
Bridge Communications (also 3Com's EtherTerm, PCS/XNS, and PCS1)	BRIDGE
Datability's Remote Access Facility	RAF
Digital's CTERM with PCSA or PATHWORKS	CTERM
Digital's DECnet-DOS	LAT
Digital's LAT with PATHWORKS	CON-MGR

Supported Network	Connection Type
Digital's LAT with PCSA	LAT
Digital's TCP/IP with PATHWORKS 4.xx (see "Telnet Support" on page 137)	CON-MGR
Digital's TCP/IP with PATHWORKS 5.0	BRIDGE
Eicon Technology's X.25 Server	EICON
Fel Computing, Inc.	MOBIUS
HP's ARPA Services 2.0 or later	BRIDGE
HP's Network Services 2.0 and 2.1	ADV.NET
HP's OfficeShare AdvanceNet	ADV.NET
HP's OfficeShare Telnet Services	HP-TELNT
IBM's LAN Asynchronous Connection Server	IBM-ACS
InterConnections TES, prior to 3.0	INT-14
InterConnections TES 3.0	CON-MGR
Interrupt-14 interface software	INT-14
Network Products ACS2	NASI
Novell's NACS	NASI
Novell's NACS (Extended NASI)	CON-MGR
Novell's NetWare for LAT	CON-MGR
Novell's NetWare for VMS	NET-VMS
Novell's Network Connect (Extended NASI)	CON-MGR
Ungermann-Bass's Net/One	U.B.
WRQ's Reflection Network Series 2.0 and later (all products in the series)	CON-MGR
WRQ's R-LAT version 2.0	LAT
WRQ's 3000 Connection 1.1 and earlier	LAT, TEL-MGR or VT-MGR
WRQ's LAT Connection 1.1 and earlier	LAT
WRQ's TCP Connection 1.1 and earlier	LAT or TEL-MGR
WRQ's Telnet Connection 1.1 and earlier	TEL-MGR

Network Connection Types

Network products supported by Reflection are discussed in alphabetical order by their Connection Type.

ADV.NET

Reflection's *ADV.NET* Connection Type (AdvanceNet) supports HP OfficeShare and HP Network Services 2.0.

To run Reflection over OfficeShare, install the OfficeShare hardware and software according to the *HP OfficeShare Network Installation and Configuration* manual. Run the USRLOAD program as described in the *HP OfficeShare Network User's Guide*.

To run Reflection over HP Network Services 2.0, install the Network Services software as described in the *Planning and Setup Guide—HP's Integration Products*.

Using AdvanceNet

Reflection's command interpreter prompt for AdvanceNet appears on the screen as the ">" character. Enter the command `CONNECT <nodename>`, where <nodename> is the HP 3000 to which you want to connect. The command interpreter returns a "Connected" message for a successful connection, and an error message for an unsuccessful one.

Session Management

You can break a connection from the PC (page 109) or from the HP 3000 with `:BYE`. When a connection is broken, Reflection displays "Disconnected" and returns to the command interpreter.

AT&T

Reflection's *AT&T* Connection Type supports the AT&T Starlan network.

Using Starlan

Reflection's command interpreter prompt for Starlan appears on the screen as the ">" character. Enter `CONNECT <nodename>`, where *<nodename>* is the Information Systems Network (ISN) node name. If the connection is successful, "Connected" appears on the screen.

Some networks require that the *nodename* terminate with a null. If this is the case on your network, type the following on the Reflection command line:

```
SET NETBIOS-NAME-DELIMITER YES
```

The default for this SET parameter is *NO*.

Session Management

To disconnect from the network, use one of the methods given on page 109. Reflection does not break the connection when you exit Reflection unless `DISCONNECT-ON-EXIT` is set to *YES*.

BRIDGE

Reflection's *BRIDGE* Connection Type provides the Bridge Application Program Interface (BAPI). The BAPI interface is used by:

- ▲ ARPA Services 2.0 or later from Hewlett-Packard (follow the procedures for installing ARPA Services as described in the *Planning and Setup Guide—HP's Integration Products*)
- ▲ PATHWORKS 5.0 for TCP/IP from Digital*
- ▲ EtherTerm and PCS/XNS using the XNS protocol (runs on standard 3Com LAN cards)
- ▲ PCS1 using the TCP/IP protocol (runs on the ILANA LAN card)

* If you are using PATHWORKS 4.xx for TCP/IP, Reflection's Telnet support is recommended. See page 137.

Using BAPI

Users of BAPI software from 3Com may experience problems using large packets for file transfers, especially on 386 or 486 PCs. For the WRQ protocol, set Frame Size to 512 or less in the File Transfer Setup dialog box.

Session Management

Some BAPI interface users can suspend and disconnect sessions; try the methods given on page 109. After a suspend or disconnect, you are back at your local prompt.

CON-MGR

Reflection's CON-MGR Connection Type supports:

- ▲ All products in the Reflection Network Series, version 2.0 or above
You can also select CON-MGR when using the LAT protocol from earlier versions of the Reflection Network Series. This is explained on page 105.
- ▲ WRQ's Telnet support (included with Reflection)
- ▲ Digital's PATHWORKS (LAT protocol)
- ▲ InterConnections TES 3.0 (for earlier versions of TES, see "INT-14" on page 103)
- ▲ Novell's NACS and Network Connect (using Extended NASI)
- ▲ Novell's NetWare for LAT

See "The Connection Manager" beginning on page 117 for information on managing sessions using the CON-MGR Connection Type.

CTERM

Reflection's CTERM Connection Type supports multiple sessions to hosts on your DECnet network with a single copy of Reflection. See page 110 for details on using CTERM.

EICON

Reflection's *EICON* Connection Type supports the EICON network. Install and configure your EICON hardware and software according to their documentation.

HP-TELNT

Reflection's *HP-TELNT* Connection Type supports the Telnet virtual terminal option provided by OfficeShare from Hewlett-Packard.

To run Reflection over OfficeShare Telnet, install the OfficeShare hardware and software for Telnet as explained in the *HP OfficeShare Network Installation and Configuration* manual. Run the USRLOAD program as described in the *HP OfficeShare Network User's Guide*.

Before running Reflection, the device driver TELNET.SYS must be loaded into the PC's memory.

Note: Users of HP ARPA Services 2.0 should use the *BRIDGE* Connection Type as described on page 100. ▲

Using OfficeShare Telnet

Reflection's command interpreter prompt for OfficeShare Telnet appears on the screen as the ">" character. Enter the command `CONNECT <nodename>`, where <nodename> is the name assigned by the OfficeShare network manager to the host with which you wish to communicate.

Session Management

You can break a connection from the PC (page 109) or from the HP 9000 with `exit`. When a connection is broken, Reflection displays "Disconnected" and returns to the command interpreter.

IBM-ACS

Reflection's *IBM-ACS* Connection Type supports the *IBM Asynchronous Connection Server* via IBM's extended Interrupt 14 interface. This interface, and the workstation software that it requires, are documented in the *IBM Local Area Network Asynchronous Connection Server Program Installation and Configuration Guide*.

You must add the DOS device driver *EBIOS.SYS* to your *CONFIG.SYS* file. The programs *REDIRECT.EXE* and *ENABLE.EXE* are used to make a network connection to a port on the server. *DISABLE.EXE* is used to break the network connection.

Using the IBM Asynchronous Connection Server

By configuring your Baud Rate and Parity in the Basic Setup or Datacomm Setup dialog box, you also configure the baud rate and parity for the port on the server. Baud rates from 300 to 19200 are supported.

By selecting *XON/XOFF* from both the Transmit and Receive Pacing list boxes in the Advanced Datacomm Setup dialog box, you configure the port on the server for *XON/XOFF* flow control.

Session Management

Use the Session # (LAN) text box in the Advanced Datacomm Setup dialog box to switch from one session to the next. You can maintain up to four sessions. Session 1 corresponds to COM1, Session 2 to COM2, Session 3 to COM3, and Session 4 to COM4.

Exiting Reflection breaks your connections.

INT-14

Reflection's *INT-14* Connection Type supports networks that use Interrupt 14, such as communications software manufactured by InterConnections, Sytek, Torus, FTP, BICC, and Wollongong. It can also be used with custom drivers written for this interrupt.

See the *IBM Technical Reference* manual for a description of Interrupt 14. The port number is set according to the Session # (LAN) text box in the Advanced Datacomm Setup dialog box.

Using InterConnections TES

Note: For TES version 3.0 see “The Connection Manager” on page 117. ▲

TES stands for Terminal Emulation Services. Using the NetWare network, TES provides a connection to any VAX on the network that is running the TES server.

To connect to a VAX using TES and Reflection:

1. Enter `TES` at the DOS prompt from the directory where `TES.COM` is located.
2. Start Reflection with the `/I` switch.
3. Select `INT-14` from the Connection Type list box in the Basic Setup or Datacomm Setup dialog box.
4. From Reflection, press `(Ctrl)-(Break)` to display the `TES>` prompt. At the prompt, enter `CONNECT <hostname>` where `<hostname>` is the name of the VAX to which you want to connect.

Session Management

At the TES prompt you can start multiple hosts sessions. To start another session, return to the `TES>` prompt by pressing `(Ctrl)-(Break)`. Use commands at the `TES>` prompt to manage your sessions. Or use the TES pop-up menu (press `(Alt)-(left)(Shift)-(T)`) for session management.

Refer to your TES documentation for information on entering commands at the `TES>` prompt.

LAT

Reflection's *LAT* Connection Type is required for the following products when using the LAT protocol:

- ▲ WRQ's R-LAT, version 2.0
- ▲ Digital's DECnet-DOS or PCSA/PC

Install the real-time scheduler (if applicable), the data link layer, and the LAT drivers as explained in the *DECnet-DOS* or *PCSA/PC* installation guide (version 4.0 or 4.1).

See your documentation for these products for information on managing multiple LAT sessions.

The CON-MGR or LAT Connection Type can be used with the following products when using the LAT protocol:

- ▲ WRQ's Reflection Network Series for DOS, version 2.0 or above

For earlier versions of the Reflection Network Series, see the discussion that follows.

- ▲ Digital's PATHWORKS

See "The Connection Manager" beginning on page 117 for information on managing sessions using either Connection Type.

Using the Reflection Network Series, Version 1.1 or Earlier

Users of the LAT protocol from the Reflection Network Series, version 1.1 or earlier, can use Connection Manager session management capability if they choose. However, the Connection Manager does not support the NS/VT and Telnet protocols from the Reflection Network Series, version 1.1 or earlier.

To use the Connection Manager with version 1.1 or earlier of the LAT protocol:

1. Edit the batch file that loads your LAT software (default name is STARTNET.BAT):
 - a) Remove the reference to LATCI.EXE.
 - b) Add lines that load the programs CONMGR.EXE and LATMGR.EXE from your Reflection directory.
2. Start Reflection.
3. Select either the CON-MGR or LAT Connection Type. In either case, you have the same Connection Manager capabilities.

See "The Connection Manager" beginning on page 117 for information on managing sessions using either Connection Type.

MOBIUS

Reflection's *MOBIUS* Connection Type supports the Mobius network from Fel Computing. To run Reflection with Mobius, you must first install the hardware and software as explained in the Mobius documentation.

NASI

Reflection's *NASI* Connection Type supports:

- ▲ Novell's NACS
- ▲ Network Products ACS² for Novell

For NACS/*NASI* implementations, the NACS portion runs on a NetWare server and the driver *NASI*<*x*>.EXE runs on the PC. The IPX protocol must also be running on the PC.

The *NASI* Connection Type supports NACS/*NASI* on the basic level; Reflection makes no direct or extended calls to the driver itself. To use the Extended *NASI* interface, see "The Connection Manager" on page 117.

Using NACS/NASI

The *NASI* prompt is configurable from the NACS server and can vary among configurations. Commands that can be used at the prompt are:

```
HELP
LIST SERVICES
```

Session Management

Although the *NASI* prompt is configurable from the NACS server, your session number is always indicated by 1:*x*> (where *x* is the current session number). The Session # (LAN) text box in the Advanced Datacomm Setup dialog box *must* match the number to the right of the colon in the *NASI* prompt. For example, *NASI*3 1:2> indicates the session number should be 2.

Troubleshooting

If your connection is producing unexpected characters, use a loopback connector at the NACS server port to which you are connecting. The loopback test indicates whether the problem is in the modem (external to the NACS server) or is a communications problem between the PC and the server.

NET-VMS

Reflection's *NET-VMS* Connection Type (same as *INT-14*) supports Novell's NetWare for VMS. See the discussion of the *INT-14* Connection Type on page 103.

RAF

Reflection's *RAF* Connection Type supports the Remote Access Facility. To run Reflection over *RAF*, you must install the hardware and software as explained in the *RAF* documentation.

TEL-MGR

Reflection's *TEL-MGR* Connection Type is required for the following products when using the Telnet protocol:

- ▲ WRQ's TelnetManager
- ▲ WRQ's Reflection Network Series, version 1.1 or earlier

See your TelnetManager or Reflection Network Series documentation for information on managing multiple Telnet sessions when using these earlier products.

The *CON-MGR* or *TEL-MGR* Connection Type can be used for the Reflection Network Series, version 2.0 or above, when using the Telnet protocol. In either case, you have the same Connection Manager capabilities. See "The Connection Manager" beginning on page 117 for information on managing sessions with version 2.0 or above.

U.B.

Reflection's *U.B.* Connection Type supports the Ungermann-Bass network. To run Reflection over this network, the Ungermann-Bass hardware and software must be installed as explained in the Ungermann-Bass documentation.

Using Ungermann-Bass

Use the guidelines below to configure Ungermann-Bass and Reflection:

- ▲ The Personal NIU for the PC should be configured with Break Sequence and Hold Sequence set to NONE.
- ▲ The Session # (LAN) text box in the Advanced Datacomm Setup dialog box of Reflection corresponds to the Ungermann-Bass Personal NIU Port number. The default value is 1, which gives you port 1. (A value of 2 gives you port 2, and so on.)
- ▲ To optimize file transfer, select 7-BIT from the Transfer Link list box in the File Transfer Setup dialog box for the WRQ protocol.

Reflection's command interpreter prompt for Ungermann-Bass appears on the screen as the ">>" character. Enter the command `CONNECT <nodename>`, where <nodename> is the node to which you want to connect.

Session Management

You can force a disconnect from the PC (page 109). To put the connection on hold, see your Ungermann-Bass documentation. A disconnect or a hold returns you to the Ungermann-Bass Command Interpreter prompt.

VT-MGR

Reflection's VT-MGR Connection Type is required for the Reflection Network Series, version 1.1 or earlier, when using the NS/VT protocol. See your Reflection Network Series documentation for information on managing multiple NS/VT sessions when using these earlier products.

The CON-MGR or VT-MGR Connection Type can be used for the Reflection Network Series, version 2.0 or above, when using the NS/VT protocol. See "The Connection Manager" beginning on page 117 for information on managing sessions using either Connection Type.

Session Management

The session management methods described below can be used with most network sessions started from Reflection. For exceptions, see information on specific Connection Types beginning on page 99.

Three basic keystrokes are available for session management:

Ctrl-F8 When you are connected over a local area network (LAN), this keystroke suspends the current session. Other methods for suspending a session are:

Command language: RESETCOMM

Menu command: Suspend (Keys menu)

Keyboard mapping function: connection-reset

Control function: $E_{Sc\&bR}$

Ctrl-F10 When you are connected over a LAN, this keystroke performs the appropriate LAN disconnect operation. Other methods for disconnecting a session are:

Command language: DISCONNECT

Connection Manager: DISCONNECT

Keyboard mapping function: disconnect

Control function: C_{SI4y}

Alt-N If the network supports multiple sessions, you can cycle through your sessions in turn. Other methods for switching between sessions are:

Command language: DISPLAY "^{&bN"

Menu command: Next Session (Keys menu)

Keyboard mapping function: next-session

Control function: $E_{Sc\&bN}$

Configuring Network Servers

Networks typically provide a variety of services, including file, print and communications services. The common communications services that Reflection supports include asynchronous (RS-232), X.25, and virtual terminal services. If you are using one of the supported networks to talk to an asynchronous communications server, use the information here to configure the server. Data communication between a PC and a host over a network requires the following:

- ▲ A hardware interface between the PC and the network
- ▲ A hardware interface between the host and the network
- ▲ Software that lets Reflection communicate with the PC hardware interface

It is usually best to configure an asynchronous communications server to do flow control with the host. Reflection can handle flow control with the network and the host, but is a good idea to have the server do flow control as well.

Some servers allow independent configuration of transmit pacing and receive pacing:

- ▲ Flow control from an asynchronous server to the host is *transmit pacing*—the host sends an XOFF to the server when the host is not ready to receive data.
- ▲ Flow control from the host to an asynchronous server is *receive pacing*—the server sends an XOFF to the host when the server is not ready to receive data.

For a VMS or UNIX system, configure the server to do XON/XOFF pacing when receiving and transmitting.

CTERM: Multi-Session Interface

Reflection's CTERM command interpreter lets you create and maintain multiple sessions to one or more DECnet hosts on your DECnet network with a single copy of Reflection. It also allows you to maintain your sessions while Reflection is not installed. For instance, you could log in to the VAX using CTERM, start a process on the host, uninstall Reflection (**(Alt-X)**), and then later restart Reflection and resume the same session. Commands are similar to those used by the DECserver 200.

Terminology

A *command interpreter session* is a control and data path between Reflection and the CTERM command interpreter (or CI). This path is established when the CTERM Connection Type is selected and remains in effect until Reflection is terminated.

A *CTERM session* is a control and data path between the CTERM command interpreter and a DECnet host. A CTERM session is created when a user connects to a node using the CONNECT command, and remains active until:

- ▲ You log off of the host node
- ▲ You disconnect the CTERM session using the DISCONNECT command
- ▲ The host terminates the session
- ▲ The CTERM command interpreter is uninstalled using the /U switch

You can switch from your current session to the command interpreter, and switch among existing CTERM sessions.

DOS Commands

The execution of local DOS-like commands from the Reflection command line while a CTERM session is active will be slower than usual due to processing overhead caused by CTERM.EXE.

File Transfer

There are several file transfer limitations using the CTERM interface:

- ▲ Only 7-bit file transfers are supported. (The default for Reflection is 8-bit. Change Transfer Link in the File Transfer Setup dialog box to 7-BIT.)
- ▲ A small packet size (128 bytes or less) should be used. On the Reflection command line, type SET FORCE-CTERM-FRAME-SIZE NO, then change the Frame Size text box in the File Transfer Setup dialog box. File transfers to the host with a larger block size will work correctly, but after the transfer is completed, characters entered in terminal mode will not be echoed on the screen.
- ▲ CTERM has a higher overhead than, for example, LAT. File transfers to the host are slower.

Installation

To run Reflection over an Ethernet network using the CTERM protocol, you must install a series of drivers that are explained in the *DECnet-DOS* or *PCSA/PC* installation guide (version 2.0 or greater of either product is required), or in the documentation for *PATHWORKS 4.0*:

SCH.EXE DNP.EXE
DLL.EXE CTERM.EXE

To use the CTERM command interpreter, it must be installed before you run Reflection. The command is entered at the DOS prompt. Its syntax is:

CTERMCI [/C:<n>] [/L:<n>] [/U]

/C:<n> Sets the number of command interpreter sessions. You need one command interpreter session for each copy of Reflection loaded on your PC. To support two CI sessions, for instance, load Reflection twice—one copy in the background and the other in the foreground.

Values: 1–4

Default: 2

/L:<n> Sets the maximum number of CTERM sessions to be supported.

Values: 1–8

Default: 2

/U Uninstalls CTERMCI. Cannot be used with any other switch.

Configuring Reflection for CTERM

To configure Reflection for CTERM:

1. Choose Datacomm from the Setup menu to open the Datacomm Setup dialog box.
2. Select CTERM from the Connection Type list box, then choose OK.

The CTERM command interpreter prompt should appear:

CTERM>

Using the Multi-Session CTERM Interface

Once the CTERM command interpreter has been installed, use the CONNECT command to create as many CTERM sessions as CTERMCI is configured to support. After a session has been created, you can return to the CTERM> prompt by disconnecting or suspending your session. If a session is suspended, it is not disconnected; you can resume it with a keystroke or a CTERM command.

From the CTERM> prompt, you can move among multiple sessions and request information using these commands:

SHOW NODES	Lists the nodes in the local PC DECnet database
SHOW SESSIONS	Shows active sessions
RESUME <n>	Continues an active session
DISCONNECT	Terminates an active session

To move among active sessions without first returning to the CTERM prompt, press **Alt-N**. (You may also need to press **Enter** to see the prompt for a particular session.) A complete description of CTERM commands begins on page 114.

The following table shows the default keystroke, mapping label, Reflection command, and equivalent escape sequence:

CTERM Command Interpreter Keystrokes

Keystroke	Mapping Label	Reflection Command
Alt-N	next-session	DISPLAY "^ [&bN"
Ctrl-F8	ci-mode	RESETCOMM (or DISPLAY "^ [&bR")

The keystrokes for moving among active sessions and returning to the CTERM command interpreter are remappable. See "Keyboard Mapping" in the Reflection *Advanced Topics* manual for information on changing the keystrokes.

Uninstalling CTERMCI

To uninstall CTERMCI enter the following command:

```
CTERMCI /U
```

CTERMCI cannot be uninstalled if you have the command interpreter session still active (for example, if you hot-key out of Reflection).

If you keep an active CTERM session after exiting Reflection (DISCONNECT-ON-EXIT is set to NO), you can still uninstall CTERM with the /U switch. However, your CTERM session will automatically be terminated.

CTERM sessions are automatically terminated when you exit Reflection and you have DISCONNECT-ON-EXIT set to YES. See the *Reflection Command Language* manual for more information on this SET parameter. This is the equivalent of the CI command DISCONNECT ALL.

Otherwise, you can exit Reflection and then resume a CTERM session when you restart Reflection.

CTERMCI Commands

You can abbreviate most CTERMCI commands to the number of letters that make it unique (for instance, use `SHOW N` for `SHOW NODES`).

When a syntax error occurs, the symbol that caused the error is displayed between forward slash characters (/). A listing of possible syntax error messages begins on page 499.

CONNECT

Creates a new session to the specified node. The syntax is:

```
CONNECT {<node>} [<description>]
```

<node>

The name of a valid Phase IV DECnet host; to determine valid node names, use `SHOW NODES`

<description>

A string containing no spaces or tabs that is displayed in the `SHOW NODES` output; use this option to differentiate among multiple sessions to the same node (17 characters maximum)

DISCONNECT

Disconnects either a single session or all sessions. The syntax is:

DISCONNECT {<session number> | ALL}

<session number> Identifies the session number of an existing session; see “SHOW SESSIONS” on page 116.

ALL Indicates that all CTERM sessions not in use by another CI session are to be terminated.

DISCONNECT terminates the CTERM session corresponding to <session number>.

FORWARDS

FORWARDS resumes the next session in your session list. The syntax is:

FORWARDS

If your current session has the highest session number or you have no current session, FORWARDS resumes the first session in the session list. When the session resumed is in the *stopped* state (see “SHOW SESSIONS” on page 116), the reason for the stop is displayed and Reflection returns to CI mode.

HELP

Displays documentation on the topic requested. If no topic is specified, a list of valid topics is displayed. The syntax is:

HELP [<topic>]

Valid topics are:

CONNECT	RESUME
DISCONNECT	SHOW NODES
FORWARDS	SHOW SERVICES

RESUME

Resumes the current session (if no *<session number>* is specified). If the session resumed is in the *stopped* state (see “SHOW SESSIONS” below), the reason for the stop is displayed, and Reflection returns to CI mode. The syntax is:

```
RESUME [<session number>]
```

<session number> The number of an existing CTERM session to be resumed.

SHOW NODES

Lists the nodes in the local PC DECnet database. To add nodes to this database, use the DECnet-DOS NCP.EXE program. The syntax is:

```
SHOW NODES
```

SHOW SESSIONS

Displays the following information about each active session:

- ▲ Session number
- ▲ Node name
- ▲ Description entered with CONNECT command
- ▲ Session status

The syntax is:

```
SHOW SESSIONS
```

The Connection Manager

The Connection Manager, available in all Reflection for DOS products, provides an interface for maintaining and managing multiple host sessions over a network. This chapter:

- ▲ Explains how to use the Connection Manager
- ▲ Provides a summary of Connection Manager commands
- ▲ Discusses Reflection's support for third-party LAT software
- ▲ Gives syntax for loading the Connection Manager program, CONMGR.EXE
- ▲ Gives syntax for loading an auxiliary LAT protocol program, LATMGR.EXE

Before you can use the Connection Manager, the CONMGR.EXE program* and your network software must be installed in memory. When you start Reflection, select CON-MGR from the Connection Type box in the Basic Setup or Datacomm Setup dialog box.

Note: If you are using a Reflection Network Series for DOS product version 2.0 or above, Connection Manager session management is also available when your Connection Type is set to VT-MGR, TEL-MGR, or LAT. ▲

The Connection Manager provides session management for each of the following network products:

- ▲ WRQ's Reflection Network Series† version 2.0 or above; see the Reflection Network Series *Reference* for more information
- ▲ WRQ's Telnet support (included with Reflection); see "Telnet Support" on page 137 for more information
- ▲ Digital's PATHWORKS (LAT); see "LAT Support for Third-Party Products" on page 132 for more information

* Under some conditions, Reflection will load CONMGR for you; see page 133.

† If you are using the LAT protocol, the Connection Manager can be used with earlier versions of the Reflection Network Series. For more information, see page 105.

- ▲ InterConnections TES 3.0; see “LAT Support for Third-Party Products” on page 132 for more information
- ▲ Novell’s NACS (Extended NASI); see “Extended NASI” on page 157 for more information
- ▲ Novell’s NetWare for LAT; see “Support for NetWare for LAT” on page 147 for more information
- ▲ Novell’s Network Connect (Extended NASI); see “Extended NASI” on page 157 for more information

Using the Connection Manager

The Connection Manager displays status information for your active host sessions. The figure below shows a copy of Reflection 2 (R2) with two active sessions listed. The current session is indicated in the “Status” column. The number of available sessions is 2, indicating that two more sessions can be initiated.

Welcome to Connection Manager Walker Richer & Quinn, Inc.				
Type "?" for command help, <Tab> for completion.				
Session	Protocol	Host name	Creator	Status
1	LAT	VAXVMS	R2	Current
2	Telnet	UNIXSERVICE	R2	
Available sessions: 2				
CON-MGR>				

The Connection Manager keeps track of sessions started by all copies of Reflection. For example, if you load Reflection 2, hot-key to DOS, and load Reflection 1 (using the /O switch), the Connection Manager displays sessions started in both copies of Reflection, R2 and R1.

Welcome to Connection Manager
Walker Richer & Quinn, Inc.

Type "?" for command help, <Tab> for completion.

Session	Protocol	Host name	Creator	Status
1	LAT	vaxvms	R2	Current
2	LAT	alphavmx	R2	
3	NSVT	MPEXL.BIZ.COM	R1	In Use
4	NSVT	MPE.BIZ.COM	R1	

Available sessions: 0

CON-MGR>

With the exception of FTP sessions, you cannot resume sessions started by a different emulator. You also cannot connect to a session attached to another copy of Reflection (its status is listed as "In use").

The Connection Manager displays session information for all of the protocols in use. In the following figure, the Telnet protocol from the Reflection Network Series, the Extended NASI protocol for Novell's NACS, and the LAT protocol for Novell's NetWare for LAT are all in use.

Welcome to Connection Manager
Walker Richer & Quinn, Inc.

Type "?" for command help, <Tab> for completion.

Session	Protocol	Host name	Creator	Status
1	LAT	vaxvms	R2	Current
2	Telnet	unixbox	R2	
3	NASI	SWITCH1	R2	

Available sessions: 1

CON-MGR>

A summary of all the commands available at the CON-MGR> prompt starts on page 123.

Session Management Keystrokes and Commands

Three basic keystrokes are available for session management:

Ctrl-F8 To suspend the current session and return to the Connection Manager, press **Ctrl-F8**. Other methods for suspending a session are:

Command language: RESETCOMM

Menu command: Suspend (Keys menu)

Keyboard mapping function: connection-reset

Control function: $\text{Esc}\&\text{bR}$

Ctrl-F10 To disconnect the current session and return to the Connection Manager, press **Ctrl-F10**. (To disconnect a session when you are at the Connection Manager, use the DISCONNECT command.)

At the Connection Manager, press **Ctrl-F10** to abort a connection attempt. If you see the message "Trying to connect to <hostname>..." you may want to back out before the connection attempt times out.

Other methods for disconnecting a session are:

Command language: DISCONNECT

Connection Manager: DISCONNECT

Keyboard mapping function: disconnect

Control function: $\text{C}_{\text{SI}4\text{Y}}$

Alt-N Moves to the next session. If you have more than one session active, you can use this keystroke to resume and suspend each session in turn. When a session is resumed, all the settings associated with it are restored.

This keystroke can be used within a session or at the Connection Manager. If you are at the Connection Manager prompt, **Alt-N** returns you to the session marked as "Current."

Other methods for switching between sessions are:

Command language: DISPLAY $\text{"^{\&\text{bN}}"$

Menu command: Next Session (Keys menu)

Keyboard mapping function: next-session

Control function: $\text{Esc}\&\text{bN}$

Managing Multiple Sessions

You have a variety of configuration options that determine how Reflection handles your Connection Manager sessions.

Suspending Sessions

By default, the Connection Manager stores session information in a temporary “state” file similar to the file created when you exit Reflection with **[Alt]-[B]**.

The temporary “state” files that are created when you move between network sessions are stored on your disk (or on your RAM drive—see page 122) and are deleted after they are used. Start a few Connection Manager sessions, then hot-key from Reflection. In the directory specified for temporary files, you will see some files with the format R<n>*.TMP. Below are some guidelines for setting up a directory for these temporary files:

- ▲ The Setup program for Reflection for DOS offers you an opportunity to specify a directory for temporary files.
- ▲ To designate a temporary directory yourself, add the following DOS SET command to your AUTOEXEC.BAT file (the directory must be on non-removeable media): SET RTMP=<directory>. If you are running a server version of Reflection, be sure that you specify a directory that is not a shared directory.

When a temporary file is created (for example, when you press **[Alt]-[N]** to move to another session) and no RTMP directory is found, Reflection goes through the following logic to find a place to store the file:

1. The files are placed in the path designated by the TMP environment variable. Typically, this is in your AUTOEXEC.BAT file, for example:

```
SET TMP=C:\TEMPDIR
```
2. If no TMP variable is defined, the files are placed in the path designated by the REFLECT<n>= environment variable. See your Reflection documentation for more information on this variable.
3. If neither of these directories is designated, the files are placed in the Reflection product directory.

To confirm which directory Reflection is using for these files, you can use the variable \$TEMPDIR. Type the following on the Reflection command line:

```
DISPLAY $TEMPDIR
```

Note: Setting up a temporary directory on your PC is particularly important if you're running a server version of Reflection (for example, R2.EXE resides on a network drive). See the information provided with your server copy of Reflection. ▲

Using a RAM Drive: To enhance your machine's performance when storing temporary files, assign a RAM drive as the location for your temporary files (if you have one set up on your machine). See your DOS documentation for information on setting up a RAM drive. If you have a RAM drive E: that is created when you reboot, add the following line to AUTOEXEC.BAT:

```
SET RTMP=E:
```

Disconnecting Sessions

By default, Reflection does not disconnect your session when you exit Reflection with **[Alt]-[X]**. When you return to Reflection, you are at the Connection Manager prompt, and sessions that were not disconnected can be resumed.

- ▲ The session-specific temporary files that save the screen image and other settings when you move from session to session are deleted when you exit Reflection with **[Alt]-[X]**. The sessions are still active. If you want sessions disconnected when you exit Reflection, use `SET DISCONNECT-ON-EXIT YES`.
- ▲ If you exit Reflection with **[Alt]-[B]**, you are not disconnected regardless of the value of `DISCONNECT-ON-EXIT`.
- ▲ Disconnect a session by doing any of the following:
 - Press **[Ctrl]-[F10]** while you are in the session, or use `DISCONNECT` at the Connection Manager prompt.
 - Exit Reflection (**[Alt]-[X]**) with `DISCONNECT-ON-EXIT` set to `YES`.
 - Uninstall the protocol manager program (VTMGR, LATMGR, or TELMGR) after you have exited Reflection.
 - While in a session, type `DISCONNECT` on the Reflection command line.

Resuming Sessions

By default, a temporary file is created when you suspend a Connection Manager session and it restores your session when you return. In the following situations, you may prefer to have the session-saving feature disabled:

- ▲ You find that you can't switch between sessions fast enough. Use `SET SESSION-STSAVE NO`. Your session is not disconnected; however, you may find you need to press `[Enter]` or use a refresh key in the host application (for example `[Ctrl]-[W]` in ALL-IN-1 on a VAX) to prompt the host to refresh your screen.
- ▲ You want to be able to see the session screen even if the host aborts your session. Set `SESSION-STSAVE` and `RESET-SESSION-SCREEN` to `NO`.
- ▲ You are running Reflection from a read-only disk and cannot specify an alternate location for the temporary state files.

Some command language files may rely on carrying Reflection settings across sessions; it is recommended that you set `SESSION-STSAVE` to `NO` to ensure that restoring previous sessions does not interfere with your program file settings.

The Reflection command language variable `$CONNECTION_HANDLE` lets you programmatically query the host session number.

Connection Manager Commands

The Connection Manager commands listed below apply to all protocols unless otherwise noted. When you are at the Connection Manager prompt (usually `CON-MGR>`), you can use the shortcuts below for any of the commands in this section:

- ▲ You do not have to type the full command. Each word in the command can be abbreviated to the smallest set of unique letters to identify the command. For example, typing `S P` is the same as typing `SHOW PROTOCOLS`, and typing `R 1` resumes session 1.
- ▲ Press `Tab` to complete a command if it is a unique string. For example, `s` followed by `[Tab]` produces `"SHOW."`
- ▲ Type `?` after you have typed in a string to see all available completions. For example, typing `SHOW ?` produces `"Protocols, Services, Sessions."`

- ▲ The following editing keystrokes are available at the Connection Manager prompt:

Ctrl-U or Ctrl-X	Erase input line
Ctrl-J or Ctrl-W	Erase previous word

Some Connection Manager commands display text to the screen. To view text that has scrolled off the screen, use **Ctrl-↑** and **Ctrl-↓** to scroll display memory.

ATTACH

```
ATTACH <servername> <username>
```

This command applies to NetWare for LAT only.

ATTACH establishes a connection to a Novell Communications Executive server. Type `ATTACH <servername> <username>` to attach to a communications server named <servername> as <username>. Both parameters are required.

You are prompted for your password. If a password is required for your username, type your password at the Password> prompt. If no password is required, press **Enter ↵**.

CONNECT

```
CONNECT <host | service | port> [options]
```

Establishes a new session to a valid service, host, or port. The maximum number of sessions depends on the session maximum specified with each protocol.

If you have multiple protocols loaded, there is a specific order used as each available protocol attempts a connection to the host, service, or port you specify:

1. LAT <service> If LAT protocol is available
2. NSVT <host> If NS/VT is available
3. TELNET <host> If Telnet is available
4. NASI <port> If Extended NASI is available

Depending on the protocols available, you can use an *alias* to request a specific connection type. Type `SHOW PROTOCOLS` at the Connection Manager prompt to see which protocols are available, or type `?` to see which aliases are available. To make

the fastest connection to a host in a multi-protocol environment, specify the protocol you want to use.

For example, you might want to type `TELNET` instead of `CONNECT` if you have more than one protocol available for a host connection and you want to ensure that Telnet is used to connect to the host.

The `CONNECT` host, service, and port options are summarized below in terms of the protocol-specific alias: you can use `CONNECT` instead of the alias with any of these options.

`LAT <service>`

Use `SHOW SERVICES` to see the available LAT services.

`NSVT <host>`

`NSVT` is applicable only when connecting to an HP 3000 host. See the *Reflection Network Series Reference*.

`TELNET <host>`

The host name can be in the form of an Internet name from your `HOSTS` file or on a domain name server. You can also use an IP address, for example:

`TELNET 124.24.36.85`

or

`CONNECT 124.24.36.85`

`NASI <port>`

Use `SHOW SERVICES` to see the available NASI ports.

PROTOCOL

`PROTOCOL <LAT | NSVT | TELNET | NASI>`

You can add `PROTOCOL` to the `CONNECT` command to specify which of the available protocols you want to use.

For example, you can use the following at the Connection Manager prompt to connect to a LAT host:

`CONNECT LATHOST PROTOCOL LAT`

This is equivalent to typing `LAT LATHOST`.

LAT Keywords

If you are using **CONNECT** or **LAT** to initiate a LAT session, you can add the following keywords:

DESTINATION <latport>

Specifies the destination port to use. This option is typically used to specify a dedicated application port on a VMS host. If this parameter is required, your system manager can provide the string that designates the port.

NODE <latnode>

When you type **SHOW SERVICES** at the Connection Manager prompt, a table shows the name of each service, the node, the rating, and a description. If you load the Reflection Network Series **RLAT.EXE** program with the **/DUPLICATE** switch, you may see the same service offered by more than one node. To ensure that you connect to the node you want, use **NODE**. The nodename should be no longer than 16 characters.

PASSWORD <password>

To connect to a password-protected service, you can supply a password as part of the **CONNECT** command. If you prefer, you can type in the password after the server prompts you for one.

Telnet Keywords

If you are using **CONNECT** or **TELNET** to initiate a Telnet session, you can add the following keywords:

BINARY

Specifies 8-bit mode for the session you are creating. If you do not use this keyword, 7-bit mode is assumed.

BREAK

Defines the **(Ctrl)-(Break)** keystroke for interrupting the host process to be a "Telnet break" for this session. If this option is not used, **(Ctrl)-(Break)** sends a "Telnet Interrupt Process" sequence when you use this keystroke.

PORT <portnumber>

Specifies a non-standard TCP port number or socket for Telnet (or FTP). The standard port for Telnet is 23, the standard port for FTP is 21.

NASI Syntax

If you are using CONNECT or NASI to initiate an Extended NASI session, you can use the following syntax:

```
NASI [<server name>:] <general name> [:<port name>]
```

[<server name>:]

This parameter identifies a NACS or NetWare Connect server, and can be up to eight characters long. You *must* include this parameter if there is more than one NASI server available.

<general name>

This parameter identifies a group of ports that provide the same type of connection; it can be up to eight characters long. To connect to any available port within this group, enter a general name.

[:<port name>]

This parameter identifies a specific port within a group, and can be up to 14 characters long.

If you enter a specific port name, a connection is only established if that port is available. If a specific port is already in use, it will be listed as "Unavailable" when you enter `SHOW SERVICES` at the `CON-MGR>` prompt.

If you don't specify whether you want to connect to either a general port or a specific port, Extended NASI will first attempt to connect to a general port using the name you provided. If no general port by that name is present, then Extended NASI will attempt to connect to a specific port by that name.

DETACH

```
DETACH <servername>
```

This command applies to NetWare for LAT only.

Terminates an established connection with a Novell Communications Executive server. Type `DETACH <servername>` to end a connection with a server named `<servername>`.

DISCONNECT

```
DISCONNECT [<session number> | ALL]
```

If a session number is not specified, disconnects the current session. To see which session is the current one, use `SHOW SESSIONS`.

`DISCONNECT ALL` disconnects all sessions in all copies of Reflection for DOS. (Sessions created with Reflection for Windows are not disconnected.)

FTP

```
FTP <host> [<port>]
```

FTP, the high-speed TCP/IP File Transfer Protocol, is available if you have installed the Reflection Network Series TELMGR.EXE program or Reflection's Telnet support described on page 137.

To open an FTP session, type `FTP <host>` at the Connection Manager prompt. You can specify a non-standard TCP port, if needed. The host name is resolved via the HOSTS file (see the *Reflection Network Series Reference*) or a domain name server. You can also type in the full IP address of the host. For example:

```
FTP 124.24.36.85
```

After connecting to the host, the Connection Manager prompt changes to an "ftp>" prompt. See "File Transfers Using FTP" on page 449 for information on performing FTP transfers. The commands that can be used at the ftp> prompt are listed on page 455.

The session management keystrokes and commands on page 120 apply to FTP sessions.

You can maintain more than one FTP session. An FTP session is not exclusively bound to a specific Reflection product; for example, an FTP session started by a copy of Reflection 4 can be resumed by a copy of Reflection 1.

The settings in the ASCII File Transfers Options Setup dialog box apply to ASCII file transfers using FTP.

HELP

HELP

Displays brief help information on all Connection Manager commands. For more detailed information on a command, type `HELP <command>`.

You can also type `?` to see a short list of available commands or legal command completions.

Here are examples of `HELP` and `?` to help you use the Connection Manager:

▲ `HELP`

Displays a summary of all Connection Manager commands

▲ `HELP CONNECT`

Displays detailed information on the `CONNECT` command

▲ `CONNECT <lathost> ?`

Displays the keywords that can be used when connecting to a LAT host

PROMPT

PROMPT <prompt>

You can customize the Connection Manager prompt by using the `PROMPT` command. This is provided for compatibility with existing command files that used an earlier command interpreter prompt (such as `LOCAL` or `TEL-MGR`), or for local customization.

The list below shows the default prompt associated with each Connection Type:

Connection Type	Default Prompt
CON-MGR	CON-MGR>
LAT	LOCAL>
TEL-MGR	TEL-MGR>
VT-MGR	VT-MGR>

For example, if you want to change your prompt to the string "LOCAL," type `PROMPT LOCAL` at the Connection Manager prompt. Choose Save from the File menu to save this prompt to your Reflection configuration file. A maximum of 23 characters can be used.

RESUME

```
RESUME [<session number>]
```

If no number is specified, the current session is resumed. Use `SHOW SESSIONS` to see a summary of sessions and session numbers. You can resume any session that is not marked as "In use" that was created by the same Reflection product that you're currently using.

SHOW ATTACHED

```
SHOW ATTACHED
```

This command applies to NetWare for LAT only.

Displays a list of the attached Novell Communications Executive servers.

If you have successfully attached to a server, the name of the server appears on this list. When you detach from a server, its name is taken off this list.

SHOW COMMSERVERS

```
SHOW COMMSERVERS
```

This command applies to NetWare for LAT only.

Displays a list of the available Novell Communications Executive servers.

SHOW PROTOCOLS

```
SHOW PROTOCOLS
```

Displays the protocols that are available. It also displays the number of sessions available and in use for each protocol. Your networking software must be loaded prior to starting Reflection. Use a protocol name as an alias for the CONNECT command if you want to be sure a specific protocol is used; see page 124.

SHOW SERVICES

```
SHOW SERVICES
```

This command applies to the LAT and Extended NASI protocols. Depending on which protocols are available, SHOW SERVICES displays the LAT service table, the NASI service table, or both.

The LAT service table includes the service name, the node, the rating, and a descriptive string for each. This information can be used when connecting to a LAT service. See the LAT-specific CONNECT keywords on page 126.

LAT Service	Node Name	Rating	Description
-----	-----	-----	-----
LEE	SOUTH	255	Alpha VMS
GRANT	NORTH	83	VAX/VMS
MCCLELLAN	NORTH	80	9600 Baud Modem
STONEWALL	SOUTH	0	9600 Baud Modem

The NASI service table includes a server name, general name, and port name for each NASI port. This information can be used when connecting to a port using Extended NASI. See the NASI-specific CONNECT syntax on page 127.

```
CON-MGR> show services
```

NASI Services		
Server Name	General Name	Port Name
-----	-----	-----
NACS1600	SALES	SALES1
NACS1600	SALES	SALES2
NACS1600	SERVICE	SERVICE1
NACS1600	SERVICE	SERVICE2

```
No LAT services available
```

```
CON-MGR>
```

SHOW SESSIONS

```
SHOW SESSIONS
```

Shows active sessions. Each session has a number so that you can specify the one you want to resume or disconnect. If a session is marked as "In use" or it was created by another type of Reflection emulator, you cannot resume that session.

Each time you return to the Connection Manager (by using **Ctrl**-**F8** to suspend the current session or **Ctrl**-**F10** to disconnect the current session), the **SHOW SESSIONS** command is automatically invoked so that you can see a status summary of all sessions.

LAT Support for Third-Party Products

The programs CONMGR.EXE and LATMGR.EXE provide session management for third-party products that utilize Reflection's LAT interface:

- ▲ Digital's PATHWORKS (LAT protocol); discussed below
- ▲ InterConnections TES 3.0; discussed below
- ▲ Novell's NetWare for LAT; see "Support for NetWare for LAT" on page 147 for more information.

PATHWORKS and TES 3.0

To use Reflection with PATHWORKS or TES 3.0:

1. Load the appropriate PATHWORKS or TES 3.0 software before you start Reflection.

For PATHWORKS:

Install the real-time scheduler (if applicable), the data link layer, and the LAT drivers as explained in the *PATHWORKS* installation guide (version 4.0 or 4.1).

For TES 3.0:

Load your Novell and TES software as explained in your *Leverage for NetWare* documentation.

2. Verify that CONMGR.EXE and LATMGR.EXE are available in the same directory as Reflection.
3. Start Reflection.

Reflection will automatically load CONMGR and LATMGR if it finds them in the Reflection directory.

4. Select the CON-MGR or LAT Connection Type in the Basic Setup or Datacomm Setup dialog box. In either case, you will have the same Connection Manager capabilities.

When you exit Reflection with **[Alt]-[X]**, CONMGR and LATMGR will be automatically uninstalled.

You must load CONMGR and LATMGR before you start Reflection if:

- ▲ You are running Reflection for DOS under Microsoft Windows.
- ▲ You want to configure CONMGR or LATMGR for number of sessions or other options described on pages 134 and 135.
- ▲ You are running anti-virus software and Reflection refuses to install, giving an error message about insufficient memory.

CONMGR Syntax

CONMGR.EXE provides session management support for the Reflection Network Series protocols and some third-party network products. CONMGR must be loaded before you can load the following programs:

LATMGR.EXE
 TELMGR.EXE (or third-party Telnet program)
 VTMGR.EXE
 NASIX.EXE

The complete syntax for CONMGR.EXE is:

```
CONMGR /UNINSTALL /? /INTERRUPT:<xx> /QUIET /SESSIONS:<n>
```

A switch can be abbreviated to the shortest unique string that identifies it; for example, you can use /U for /UNINSTALL.

/UNINSTALL	Uninstalls CONMGR. The programs listed above must be uninstalled before CONMGR can be uninstalled.
/?	Provides a summary of CONMGR syntax.
/INTERRUPT:<xx>	Specifies the interrupt where CONMGR is to be installed. By default, 60 (hexadecimal) is used if it is available. Otherwise, the first available interrupt in the range 60–66 is used. Values: 40–7F Default: 60
/QUIET	Suppress confirmation messages when CONMGR is loaded or unloaded.
/SESSIONS:<n>	Specifies the number of sessions to be supported including all installed protocols. Values: 1–255 Default: 4

LATMGR Syntax

LATMGR.EXE provides session management support for the LAT protocol. If you are loading LATMGR, you must load CONMGR.EXE first. The complete syntax for LATMGR.EXE is:

```
LATMGR /UNINSTALL /? /ENV /KILL /QUIET /SESSIONS:<n> /SLOTS:<n>
```

A switch can be abbreviated to the shortest unique string that identifies it; for example, you can use /U for /UNINSTALL.

/UNINSTALL	Uninstalls LATMGR. If sessions were active when you exited Reflection, they are disconnected. You cannot uninstall if you have hot-keyed from Reflection.
/?	Provides a summary of LATMGR syntax.
/ENV	Causes LATMGR to keep its DOS environment segment. This enables "LATMGR" to be displayed by a memory mapping utility such as MAPMEM. This switch requires additional memory.
/KILL	Uninstalls LATMGR even if there are active sessions. This switch "forces" a disconnect of all LAT sessions.
/QUIET	Suppress confirmation messages when LATMGR is loaded or unloaded.
/SESSIONS:<n>	Specifies the number of LAT sessions to be supported. Values: 1-16 Default: 2
/SLOTS:<n>	Sets the number of receive buffers per LAT session. These buffers are used to hold incoming characters. Values: 2-9 Default: 4

Telnet Support

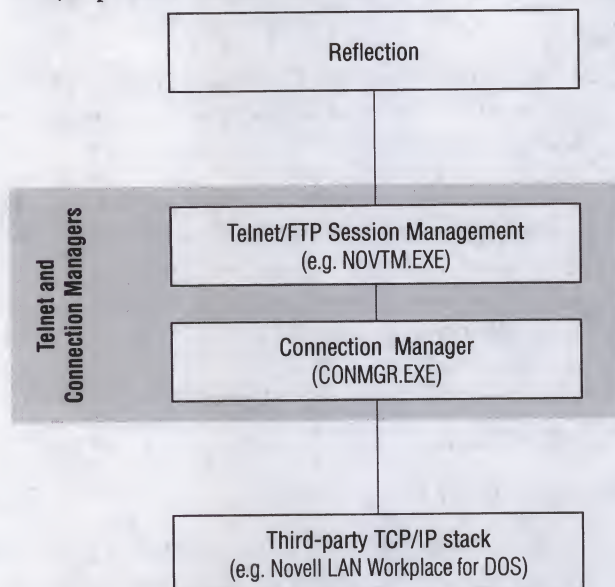
Reflection version 5.0 includes Telnet support. The Reflection Setup program allows you to install Telnet support when you install Reflection, or at a later time. See "Installing Telnet Support" on page 21.

Reflection's Telnet support provides economical and efficient terminal emulation over various third-party TCP/IP products. WRQ's implementation of the Telnet protocol provides terminal communications between a PC running Reflection and one or more network hosts. You can maintain up to eight simultaneous Telnet sessions (Telnet or FTP) using this Telnet support.

Reflection's Telnet support works with the following third-party TCP/IP products:

- ▲ Sun PC-NFS Network Software
- ▲ Sun PC-NFS Network Software (using NIS)
- ▲ Novell LAN Workplace for DOS (version 4.0 and higher)
- ▲ Ungermann-Bass NET/ONE for DOS
- ▲ FTP PC/TCP Network Software for DOS (version 2.05 and lower)
- ▲ FTP PC/TCP Network Software for DOS (version 2.10 and higher)
- ▲ Wollongong PathWay for DOS
- ▲ 3-Com TCP with Demand Protocol Architecture
- ▲ Hewlett-Packard ARPA Services (version 2.0 and higher)
- ▲ DEC PATHWORKS for DOS (version 4.xx using TCP/IP)
- ▲ Fusion Network Software
- ▲ Microsoft LAN Manager (version 2.10 and higher using TCP/IP)
- ▲ Beame & Whiteside BWNFS Network Software

The following figure shows how the Telnet support program for your third-party TCP/IP product and the Connection Manager work with Reflection:



Telnet Support Overview

Telnet Requirements

PC requirements for Telnet support are no different than those for running Reflection; you may have additional hardware requirements for your third-party TCP/IP software.

What's Included

When you install Reflection's Telnet support, a batch file called STARTTEL.BAT is created. Run this batch file to load your Telnet software. To load Telnet support automatically, add STARTTEL.BAT to your AUTOEXEC.BAT file. A batch file called STOPTEL.BAT, which unloads your Telnet support, is also provided.

STARTTEL.BAT loads CONMGR.EXE, a program that manages your connections, and the Telnet program required by your third-party TCP/IP product:

NFSTM.EXE	Sun PC-NFS Network Software. This program works with Sun networks that use NIS and those that do not.
NOVTM.EXE	Novell's LAN Workplace for DOS (version 4.0 and higher). Version 4.01 or higher of this program is recommended if you intend to use FTP.
UBTM.EXE	Ungermann-Bass Net/ONE for DOS.
FTPTM.EXE	FTP's PC/TCP Network Software for DOS version 2.05 or lower, or FTP compatible software.
FTPTM210.EXE	FTP's PC/TCP Network Software for DOS, version 2.10.
WINTM.EXE	Wollongong's PathWay Access for DOS (version 1.0 and higher). See page 143 for more information. An alternate version, WRQTM.EXE, is also available on disk.
OPNTM.EXE	This program is used for several third-party products: 3Com's TCP with Demand Protocol Architecture; Hewlett-Packard's ARPA Services (version 2.0 and higher); DEC's PATHWORKS for DOS (version 4.xx); and Microsoft's LAN Manager (version 2.10 and higher using TCP/IP). See page 143 for additional information on these options.
BWTM.EXE	Beame & Whiteside BWNFS Network Software.

Starting Telnet

The instructions below assume that you have used Reflection's Setup to install your Telnet support. See page 21.

1. Confirm that your TCP/IP software is installed.
2. Run STARTTEL.BAT.

This batch file loads CONMGR and your third-party Telnet program.

3. Start Reflection.
4. In the Basic Setup or Datacomm Setup dialog box, select CON-MGR from the Connection Type list box and choose OK.
5. At the CON-MGR> prompt, type `CONNECT <host>` or `CONNECT <IP address>` to connect to your host computer.

See page 124 for information on the `CONNECT` command and page 126 for keywords you can use when initiating a Telnet connection.

Session Management

Reflection's Connection Manager provides session management capability when using Reflection's Telnet support. See "The Connection Manager," beginning on page 117, for the following information: how to manage sessions, session management keystrokes, the Connection Manager commands, and syntax for loading the CONMGR program.

FTP File Transfers

When you use Reflection's Telnet support, you also have support for FTP file transfers. You can use FTP to transfer files with your host provided your host is running an FTP server. See "File Transfers Using FTP" on page 449.

Telnet Syntax

The batch file STARTTEL.BAT loads CONMGR and your third-party Telnet program. You can configure CONMGR and your Telnet program by adding switches to your STARTTEL.BAT file. For information on switches that can be used when loading CONMGR, see page 134.

All of the Telnet programs provided (see page 139) support the same switches. The complete syntax for the Telnet programs is:

```
<Telnet program> /? /UNINSTALL /BUFFERSIZE:<n> /ENV /KILL  
/PASSIVE /SESSIONS:<n> /WINDOWS
```

A switch can be abbreviated to the shortest unique string that identifies it; for example, you can use /U for /UNINSTALL.

/?

Lists options for the Telnet Manager program.

/UNINSTALL

Uninstalls the Telnet Manager program. If sessions were active when you exited Reflection, they are disconnected.

/BUFFERSIZE:<n>

Specifies the buffer window for each Telnet/FTP session. Lowering the value may slow performance; raising the value may increase performance, but requires more memory.

Values: 256–1500

Default: 1024

/ENV

Causes the Telnet Manager program to keep its DOS environment segment after becoming resident. This enables the program name to be displayed by a memory mapping utility such as MAPMEM. This switch requires additional memory. It is not necessary with DOS utilities such as MEM /C.

/KILL

Uninstalls the Telnet Manager program even if there are active sessions. This switch forces a disconnect from Telnet sessions and from FTP sessions in Reflection.

/PASSIVE

Telnet does not advertise capabilities on startup, and does not initiate any option negotiation. This switch may be required for Telnet in some environments, such as SCO Xenix TCP/IP.

/SESSIONS:<n>

Specifies the maximum number of Telnet and/or FTP sessions to be supported. In order to have access to the number of sessions you request here, confirm that the number of you request for CONMGR is the same or higher.

Values: 1–8

Default: 2

/WINDOWS

This switch applies only when using Telnet support with Reflection for Windows.

Other TCP/IP Software

If you are using network software that is not one of the choices listed on page 137, check to see if the company redistributes FTP software. In most cases, an FTP copyright notice should appear on your network software distribution disk, your network software documentation, or on the screen when you load the network software. If the copyright is present, choose FTP PC/TCP when the setup program prompts you for a TCP/IP provider. You can also check for the following:

- ▲ In older versions of PC/TCP, the device driver IPCUST.SYS is in your CONFIG.SYS file.
- ▲ In newer versions of PC/TCP, an environment variable is set to PCTCP. Type SET at the DOS command line to see if there is a line similar to the following:

```
PCTCP=C:\CONFIG
```


Products that use SOCKTSR.EXE

The following products provide the program SOCKTSR.EXE, which must be loaded in order to run Telnet:

- ▲ HP ARPA Services
- ▲ Digital's PATHWORKS version 4.xx using TCP/IP
- ▲ 3Com's TCP with Demand Protocol Architecture
- ▲ Microsoft LAN Manager using TCP/IP

Version 2.1A and higher of Microsoft LAN Manager uses SOCKETS.EXE; earlier versions used SOCKTSR.EXE

The PROTOCOL.INI file for these products includes a "numsockets" parameter for the Sockets driver section. Calculate the value of "numsockets" by adding 2 to the number of Telnet sessions you plan to maintain.

Wollongong PathWay Access

To achieve optimum receive performance, set the number of large TCP buffers to 10.

If you experience problems with Telnet after selecting the Wollongong option, you can try the following:

1. Locate the program WRQTM.EXE on your Telnet support disks.
2. Copy WRQTM.EXE into your Telnet directory (\\WRQNET is the default directory).
3. Modify STARTTEL.BAT so that it loads WRQTM.EXE rather than WINTM.EXE.

Novell LAN Workplace for DOS

If you are using Reflection's Telnet support with version 4.0 of LAN Workplace for DOS, include the following DOS environment variable in your AUTOEXEC.BAT file:

```
SET EXCELAN = <LAN Workplace directory>
```

If you are using version 4.1 of LAN Workplace for DOS, include the following keyword in the Protocol TCPIP section of your NET.CFG file:

```
Path TCP_CFG <LAN Workplace directory>
```

For either version of LAN Workplace, place your HOSTS file in the \TCP subdirectory of your LAN Workplace directory.

PC-NFS

If you're using PC-NFS, you must indicate if you are using NIS (network information services, formerly Yellow Pages). The batch file that loads the Telnet support software is different when you're using NIS:

```
<PC-NFS path> RTM           ;PC-NFS Resident Transport Module
<PC-NFS path> RNMNIS        ;if you're using NIS
                  CONMGR
                  NFSTM      ;Telnet for PC-NFS
```

or

```
<PC-NFS path> RTM           ;PC-NFS Resident Transport Module
<PC-NFS path> RNMFILE       ;if you're not using NIS
                  CONMGR
                  NFSTM      ;Telnet for PC-NFS
```

Your PC-NFS path is provided by the Telnet support setup program based on the environment variable NFSPATH (set in AUTOEXEC.BAT).

If you are using version 3.5 or earlier of PC-NFS, you may not have copies of RTM.EXE, RNMNIS.EXE, or RNMFILE.EXE. Your Telnet support disks have versions of these programs. Copy them into your \WRQNET directory and create a STARTTEL.BAT file similar to the samples above—in this case, the programs are in your \WRQNET directory rather than your PC-NFS directory.

After copying these files, type `RTM /H` or `RNMNIS /H` or `RNMFILE /H` for information.

PC-NFS Name-to-Address Mapping

When you select PC-NFS from the Telnet support setup menu, you must also indicate whether you're using NIS (network information services, formerly Yellow Pages). Depending on your answer, RNMFILE or RNMNIS is included in your STARTTEL.BAT file.

RNMFILE.EXE	Contains the name-to-address mapping routines for the Internet Protocol suite with local system file (i.e., HOSTS) lookup capabilities.
RNMNIS.EXE	Contains the name-to-address mapping routines for the Internet Protocol suite with NIS lookup capabilities.

Support for NetWare for LAT

Reflection for DOS supports NetWare for LAT from Novell. NetWare for LAT is an NLM (NetWare Loadable Module) that runs on a Novell Communications Executive server. It provides PCs on Novell networks with access to LAT services.

With Reflection and the NetWare IPX protocol on your PC, you first connect to a Communications Executive server running NetWare for LAT. You can then use NetWare for LAT on the server to log on to LAT services on the network.

Note: If you are using Reflection Network Series for DOS software:

- ▲ Load the copies of CONMGR and LATMGR provided with Reflection version 5.0.
- ▲ Support for NetWare for LAT (NLAT.EXE) cannot be loaded at the same time as the Reflection Network Series LAT protocol (RLAT.EXE).
- ▲ Reflection's fast file transfer is not supported when using NetWare for LAT.

NetWare for LAT Requirements

The requirements for using Reflection with NetWare for LAT are:

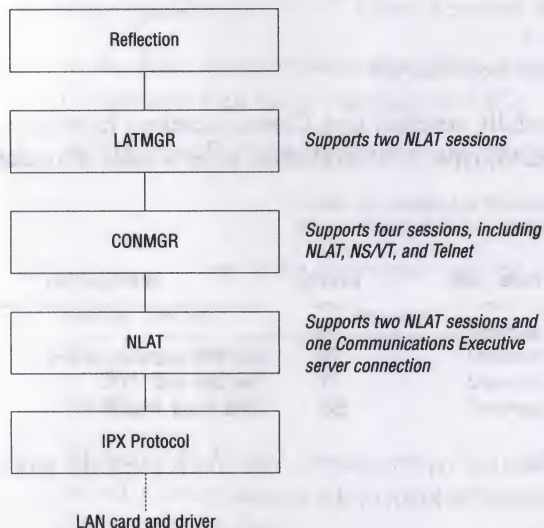
- ▲ Version 4.31 or higher of Reflection for DOS must be installed on your PC or on a network server.
- ▲ Your PC must be using the IPX protocol for access to a Novell network.
- ▲ NetWare for LAT and the Novell Communications Executive software must be installed and configured on the Novell server. For information on purchasing this software, contact your Novell representative.

Session Management

Reflection's Connection Manager provides session management capability when using Reflection's NLAT support. See "The Connection Manager," beginning on page 117, for the following information: how to manage sessions, session management keystrokes, the Connection Manager commands, and syntax for loading the CONMGR and LATMGR programs.

Configuring Server Connections and NLAT Sessions

When you load NLAT, CONMGR, and LATMGR without switches, their default values are used. The figure below shows how many servers and sessions each layer of software will support by default:



The default configuration supports one Communications Executive server connection (NLAT default) and up to two NLAT sessions (both LATMGR and NLAT default to two sessions).

Configuring NLAT for Multiple Server Connections

By default, NLAT.EXE supports one Communications Executive server connection. To configure NLAT for additional server connections, use the following switch when loading NLAT from the DOS prompt:

```
NLAT /CKT:<n>
```

The value <n> specifies the number of Communications Executive server connections you want to support. Each connection you support uses additional memory.

Values: 1–8

Default: 1

For more information on NLAT syntax, see page 155.

Server Connections and NLAT Sessions

Each Communications Executive server connection you make (using the ATTACH command) allows you to start up to four NetWare for LAT (NLAT) sessions. Also see the following topic, “Configuring NLAT, LATMGR, and CONMGR for NLAT Sessions.”

If you have one Communications Executive server, then you can make one server connection and start up to four NLAT sessions (using the CONNECT or LAT command). If you have two servers and you have configured NLAT to support two server connections, then you can connect to both servers and start four NLAT sessions using each server, for a total of eight sessions.

Configuring NLAT, LATMGR, and CONMGR for NLAT Sessions

NLAT, LATMGR, and CONMGR each play a part in determining how many NetWare for LAT (NLAT) sessions you can have. Also see the preceding topic, “Server Connections and NLAT Sessions.”

Using their default values, NLAT, LATMGR, and CONMGR will support up to two NLAT sessions. If you attempt to start more sessions than you have support for, the message “Protocol is out of resources” is displayed. If you require more sessions, load the programs using switches. Support for additional sessions uses additional memory.

NLAT

To configure NLAT.EXE for additional NLAT sessions, use the following switch when loading NLAT from the DOS prompt: `NLAT /SESSIONS:<n>`. The value <n> specifies the number of NLAT sessions you want to support.

Values: 1–16

Default: 2

CONMGR

To configure CONMGR.EXE to support more than four sessions, including sessions that use NLAT and sessions that use the NS/VT and Telnet protocols that come with the Reflection Network Series,* use the following switch when loading CONMGR from the DOS prompt: `CONMGR /SESSIONS:<n>`. The value <n> specifies the number of sessions you want to support, including NLAT, NS/VT, and Telnet sessions.

Values: 1–255

Default: 4

LATMGR

To configure LATMGR.EXE for additional NLAT sessions, use the following switch when loading LATMGR from the DOS prompt: `LATMGR /SESSIONS:<n>`. The value <n> specifies the number of NLAT sessions you want to support.

Values: 1–16

Default: 2

Type `SHOW PROTOCOLS` at the `CON-MGR>` prompt to see how many LAT sessions you can support.

For more information on NLAT syntax, see page 155. For CONMGR and LATMGR syntax, see page 134.

* In this version of Reflection, support for NetWare for LAT (NLAT.EXE) cannot be loaded at the same time as the Reflection Network Series LAT protocol (RLAT.EXE).

Example: Two Communications Executive Server Connections

To connect to two Communications Executive servers:

1. Configure NLAT by typing `NLAT /CKT:2` at the DOS prompt. Also load CONMGR and LATMGR using their default values.
2. Start Reflection and confirm that CON-MGR is the Connection Type (in the Datacomm Setup dialog box).
3. At the CON-MGR> prompt, type `SHOW COMMSERVERS` to see a list of available Novell Communications Executive servers.
4. Repeat the `ATTACH <servername> <username>` command for each server you want to connect to. At the Password> prompt, type your password if one is required. If no password is required, press **Enter** at the prompt.
5. Type `SHOW SERVICES` to see a table of available LAT services. The LAT table will show all LAT services provided by all attached communications servers. The column "Node Name" shows which server provides each service:

CON-MGR> show services

LAT Service	Node Name	Rating	Description
BBS	server2	4	
VAX2	server2	74	OpenVMS version 5.5-2
ALPHA2	server2	77	OpenVMS AXP (TM)
MODEM	server2	255	9600 Baud Hayes
BBS	server1	4	
VAX1	server1	63	OpenVMS version 5.5-2
ALPHA1	server1	66	OpenVMS AXP (TM)
MODEM	server1	255	9600 Baud Hayes

6. To connect to a LAT service, type: `CONNECT <service> [NODE <nodename>]`.
The <service> parameter is required. If a LAT service is available from more than one server, you can use the `NODE <nodename>` parameter to specify which server to use. Use the name shown in the "Node Name" column of the LAT table for <nodename>.
7. Log on to your LAT service as usual.

Because you loaded NLAT and LATMGR with default session support (two sessions), you can start one additional NLAT session.

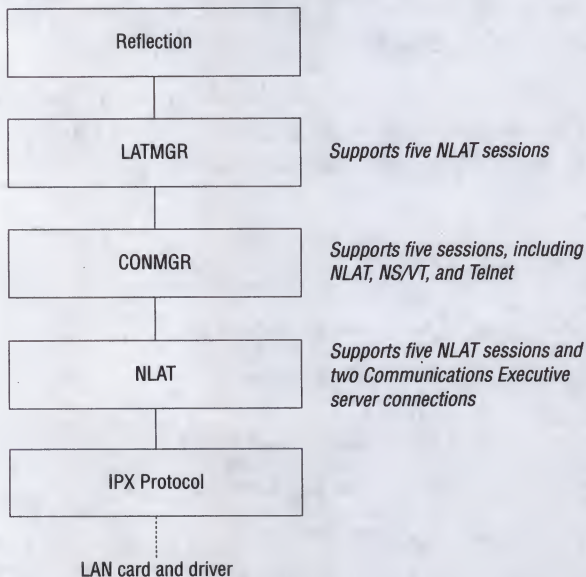
Example: Five NLAT Sessions

Use the following switches to support two Communications Executive server connections and five NLAT sessions (this assumes that the NS/VT and Telnet protocols are not in use):

```
NLAT /CKT:2 /SESSIONS:5  
CONMGR /SESSIONS:5  
LATMGR /SESSIONS:5
```

For convenience, the commands can be included in a DOS batch file.

The figure below shows how many servers and sessions each layer of software will support when these switches are used:



Each Communications Executive server connection you make allows you to start up to four NLAT sessions. To start five NLAT sessions, you must be using at least two servers.

How to Uninstall NetWare for LAT Support

To terminate connections and exit from Reflection and NLAT:

1. As you finish each NLAT session, log off the LAT service.
2. When you have logged off all LAT services, type `DETACH <servername>` to disconnect from a Communications Executive server named `<servername>`.
3. To exit Reflection, press `[Alt]-[X]`.
4. To uninstall the NLAT support software, go to the Reflection directory and use the uninstall switch (`/U`) at the DOS prompt as follows:

```
LATMGR /U
CONMGR /U
NLAT /U
```

NLAT.EXE Syntax

You can create a batch file that loads the NLAT, CONMGR, and LATMGR programs. By adding switches to your batch file, you can configure the programs for session support and other parameters.

For information on switches that can be used when loading CONMGR and LATMGR, see page 134.

The complete syntax for NLAT.EXE is:

```
NLAT /? /CKT:<n> /DIR:<n> /INT:<xx> /KILL /QUIET
/SESSIONS:<n> /UNINSTALL
```

A switch can be abbreviated to the shortest unique string that identifies it; for example, you can use `/U` for `/UNINSTALL`.

/?	Provides a summary of NLAT syntax.
/CKT:<n>	Determines the number of Communications Executive servers the PC can connect to. Values: 1-8 Default: 1
/DIR:<n>	Sets the maximum number of server entries allowed in directory; a large directory uses more memory. Values: 1-500 Default: 10
/INT:<xx>	Specifies the interrupt (in hexadecimal) used for communication between NLAT and LATMGR. Values: 40-7F Default: 6A
/KILL	Uninstalls NLAT from memory, even when sessions are active.
/QUIET	Suppresses the display of confirmation messages to the screen when NLAT is loading.
/SESSIONS:<n>	Determines the number of NLAT sessions the PC can start. Values: 1-16 Default: 2
/UNINSTALL	Uninstalls NLAT from memory. When sessions are active, NLAT displays an error message and does not uninstall.

Version 5.0 of Reflection supports Novell's Extended NASI interface. Extended NASI is the PC component of two modem server products: Novell Asynchronous Connection Server (NACS), and NetWare Connect server. The Extended NASI driver (NASI3.EXE or NASI.EXE) runs on the PC, and the NACS or NetWare Connect portion runs on a NetWare server.

Use Reflection's CON-MGR Connection Type to establish communications with these NASI servers. (Do not select the NASI Connection Type; it is only for basic NASI services.)

The number of ports you can connect to with Extended NASI is controlled by the NetWare server. The CON-MGR Connection Type allows 1–255 sessions using the /SESSIONS:<n> switch (the default is four sessions).

Extended NASI Requirements

The requirements for using Reflection with Extended NASI are:

- ▲ Version 5.0 of Reflection for DOS must be installed on your PC or on a network server.
- ▲ Your PC must be using the IPX protocol for access to a Novell network.
- ▲ Novell Asynchronous Connection Server (NACS) software, or NetWare Connect server software, must be installed and configured on the Novell server.
- ▲ The Extended NASI driver (NASI3.EXE or NASI.EXE) must be loaded on your PC.
- ▲ The Reflection Network Series Connection Manager software (CONMGR.EXE) must be loaded on your PC.
- ▲ Reflection's Extended NASI converter software (NASIX.EXE) must be loaded on your PC.

Connecting to a NASI Port

To connect to a NASI port using Reflection with Extended NASI:

1. Confirm that IPX.COM or IPXODI.COM is loaded on your PC. To do this, run the MEM utility at the DOS prompt by typing `MEM/C`. (This utility comes with DOS version 5.0 or higher).
2. Confirm that the Novell NetWare workstation shell (NETX.EXE or NET5.COM) is loaded on your PC. Use the MEM utility as described in the previous step.
3. Change to the directory where the Extended NASI program (NASI3.EXE or NASI.EXE) is located and load the driver by entering the appropriate command at the DOS prompt:

`NASI3`

or

`NASI`

4. Change to the directory where Reflection is installed and load the Connection Manager program by entering this command at the DOS prompt:

`CONMGR`

5. Load Reflection's Extended NASI converter program (NASIX.EXE) by entering this command at the DOS prompt:

`NASIX`

6. Start Reflection.
7. Choose Datacomm from the Setup menu to open the Datacomm Setup dialog box.
8. Select CON-MGR from the Connection Type list box and choose OK.

9. Next you'll see Reflection's Connection Manager screen:

```

Welcome to Connection Manager
Walker Richer & Quinn, Inc.

Type "?" for command help, <Tab> for completion.

Session Protocol      Host name      Creator      Status
-----
Available sessions:  4

CON-MGR>

```

10. At the CON-MGR> prompt, type SHOW PROTOCOLS to verify that Extended NASI is available:

```

CON-MGR> show protocols

Ext NASI  Nasi Converter Version 2.10b

```

11. At the CON-MGR> prompt, type SHOW SERVICES to see a list of available NASI servers similar to the one shown here:

```

CON-MGR> show services

Nasi Services
Server Name      General Name      Port Name
-----
NACS1600         SALES             SALES1
NACS1600         SALES             SALES2
NACS1600         SERVICE           SERVICE1
NACS1600         SERVICE           SERVICE2
NACS2001         MARKETNG         TRADE_SHOWS1

```

12. To connect to a NASI port, use the following syntax at the CON-MGR> prompt:

```
CONNECT [<server name>:] <general name> [:<port name>]
```

See page 124 for information on the CONNECT command and page 127 for information on the parameters used to specify your NASI port connection.

Session Management

Reflection's Connection Manager provides session management capability when using Reflection's Extended NASi support. See "The Connection Manager," beginning on page 117, for the following information: how to manage sessions, session management keystrokes, the Connection Manager commands, and syntax for loading the CONMGR program.

Examples of Extended NASi Syntax

Following are two examples of the syntax used to connect to Extended NASi ports using the services shown below. When there is only one server available, you do not need to use <server name> in the syntax.

```
CON-MGR> show services
```

Nasi Services		
Server Name	General Name	Port Name
-----	-----	-----
NACS1600	SALES	SALES1
NACS1600	SALES	SALES2
NACS1600	SERVICE	SERVICE1

To connect to any available server port providing a modem connection to Sales, enter the following at the CON-MGR> prompt:

```
CONNECT SALES
```

To connect to a specific server port, such as SALES2, enter the following at the CON-MGR> prompt:

```
CONNECT SALES:SALES2
```

Following are two examples of the syntax used to connect to Extended NASI ports when there is more than one server available.

```
CON-MGR> show services
```

Nasi Services		
Server Name	General Name	Port Name
-----	-----	-----
NACS1600	SALES	SALES1
NACS1600	SALES	SALES2
NACS1600	SERVICE	SERVICE1
NACS2001	MARKETING	TRADE_SHOWS1

To connect to any available server port providing a modem connection to Sales on server NACS1600, enter the following at the CON-MGR> prompt:

```
CONNECT NACS1600:SALES
```

To connect to a specific server port, such as SALES2, enter the following at the CON-MGR> prompt:

```
CONNECT NACS1600:SALES:SALES2
```

Configuring a NASI Port

By default, a NASI port is configured by a network administrator and is not affected by Reflection. If you want Reflection to configure a NASI port, use the following SET command:

```
SET CONFIGURE-NASI-PORT {YES | NO}
```

The default value is for this SET command is NO. When this parameter is set to YES, Reflection's datacomm settings are used to configure a NASI serial port on a remote Novell Asynchronous Connection Server (NACS) or a NetWare Connect server when using the CON-MGR Connection Type.

Reflection's NASI Converter Syntax

You can create a batch file that loads your Extended NASI driver, the CONMGR program, and Reflection's Extended NASI converter (NASIX.EXE). By adding switches to your batch file, you can configure the programs for session support and other parameters.

You must load CONMGR after you load your NASI driver (see your Novell documentation) and before you load NASIX. For information on switches that can be used when loading CONMGR, see page 134.

The complete syntax for NASIX.EXE is:

```
NASIX /UNINSTALL /? /ENV /KILL
```

A switch can be abbreviated to the shortest unique string that identifies it; for example, you can use /U for /UNINSTALL.

/UNINSTALL	Removes the Extended NASI converter from memory.
/?	Provides a summary of the Extended NASI converter syntax.
/ENV	Causes the Extended NASI converter to keep its DOS environment segment. This enables "NASIX" to be displayed by a memory mapping utility such as MAPMEM. This switch requires additional memory.
/KILL	Uninstalls the Extended NASI converter even if there are active sessions.

Setup for Other Hosts

Walker Richer & Quinn's Reflection Series for DOS includes DEC terminal emulators (Reflection 2 and Reflection 4), Hewlett-Packard terminal emulators (Reflection 1 and 7), and an IBM 3270 Display Station emulator (Reflection 8). If you want to connect to a UNIX host and transfer files, or if you want to connect to other hosts and don't necessarily need a full emulator, use the setup changes outlined in this chapter.

Setup for UNIX Hosts

Reflection includes a proprietary host program (unxlink2) for transferring files to and from a UNIX machine. When you run the command file that uploads unxlink2 (UPLOADUX.RCL), setup values for a UNIX connection are automatically set. These values are as follows:

Setup Dialog Box	Field Name	Value
Advanced Datacomm	Receive Pacing	XON/XOFF
Advanced Datacomm	Transmit Pacing	XON/XOFF
File Transfer	Host Startup Sequence	<i>unxlink2</i> (lowercase!)
File Transfer	Frame Size	64-256
ASCII File Transfer	Change Tabs to Spaces	Cleared
ASCII File Transfer	Change Spaces to Tabs	Cleared
Advanced Datacomm	Line Transmit Delay	1

UNIX File Transfer

With many UNIX systems you may experience difficulties transferring files to the host unless you set some additional parameters. This is because many UNIX systems cannot always process large blocks of data at higher speeds.

For some systems, the SET parameters below work if you are connected directly to the host at 9600 baud. On the command line, enter the following:

```
SET TRANSFER-WINDOW-SIZE 2  
SET TRANSFER-FRAME-SIZE 128
```

It might also be necessary to add a line transmit delay if the speed of the transfer is too high for the host to handle (9600 baud or more). Change this in the Advanced Datacomm Setup dialog box. Experiment to find the most efficient settings for file transfers with your particular UNIX host.

If a UNIX system is your primary host, you may want to save these values to the default configuration (R2.CFG or R4.CFG). Otherwise, save them to a configuration file with the suggested name of UNIX.CFG. The configuration can then be loaded when starting Reflection (for example, by typing `R2 UNIX.CFG` at the DOS prompt), or from within Reflection (by selecting UNIX.CFG from the Files list box in the File Open dialog box).

Note: Some systems with job control capabilities use ^Z as a *suspend* character. This is handled appropriately under the Reflection default for UNIX systems. If this character has been redefined by you or your system manager, you may need to make corresponding changes to the transfer procedure. An example is shown on page 204.

Setup for IBM Hosts

Many protocol converters provide a 3270 terminal emulation mode that allows your ASCII terminal to emulate an IBM 3270 Display Station, for communication with an IBM mainframe. Typically, the protocol converter displays a menu of terminal types: you select the terminal you are using to make the connection to the mainframe. A common menu choice is VT100.

Because Reflection is able to emulate a number of terminals, it is possible, working with a protocol converter, to make a PC running Reflection appear to be an IBM 3270-style terminal. (A separate product, Reflection 8, provides more complete emulation of an IBM 3270 Display Station as well as FTP file transfer between the PC and the IBM host.)

To communicate with an IBM host, you will need to change the values in some Setup dialog boxes and some Reflection commands.

Setup for VM/CMS

Setup Dialog Box or RCL	Field Name	Value
Datacomm	Parity	7/EVEN
Advanced Datacomm	Receive Pacing	NONE
Advanced Datacomm	Transmit Pacing	NONE
Keyboard	Local Echo	Cleared
SET HOST-PROMPT	N/A	"^Q"*

Setup for MVS/TSO

Setup Dialog Box	Field Name	Value
Datacomm	Parity	7/EVEN
Advanced Datacomm	Receive Pacing	NONE
Advanced Datacomm	Transmit Pacing	NONE
Keyboard	Local Echo	Cleared

Remapping the PC Keyboard

There are a number of 3270 functions, represented by keys on the 3270 keyboard, that aren't on a PC keyboard. For each function, the protocol converter expects a certain keystroke sequence from the asynchronous terminal that it can translate into one that the mainframe understands.

If you are emulating a VT100 terminal, for instance, the IBM 7171 protocol converter requires (by default) that the sequence **Esc-O-M** be entered for the mainframe to understand that the "clear screen" function is intended. You can use Reflection's keyboard mapping feature to remap this keystroke.

* This sets a ^{DC}1 character as the host prompt. To reset this field to its default value (no host prompt), enter SET HOST-PROMPT "^@".

For example, to map the clear screen function to the keypad  key, follow these steps:

1. Put the following lines in a text file:

```
keyboard-id = enhanced  
kp-plus = "^[OM"
```

2. Save this file using a name that indicates its contents and ends with .KBM, such as 7171.KBM.
3. At the DOS prompt, compile the file using the keyboard mapping compiler (KEYCOMP), and make it an integral part of your configuration file. In this example the configuration file is called IBM.CFG:

```
KEYCOMP 7171.KBM IBM.CFG
```

4. Run Reflection using the IBM.CFG configuration file (<n> represents the Reflection product you are using—Reflection 2 or Reflection 4):

```
R<n> IBM.CFG
```

5. Once you are connected to the mainframe via the 7171 protocol converter, press the keypad  key to send the IBM 3270 clear screen function to the host.

The example above explains how to remap just one function; Reflection's keyboard remapping lets you assign any number of functions to whatever keystrokes you choose. See "Keyboard Mapping" in the Reflection *Advanced Topics* manual.

Note: Some protocol converters have been reconfigured such that a sequence other than the default is expected in order to emulate a 3270 function. Try to communicate using the defaults; if a problem arises, check with the systems programmer to see if the protocol converter has been reconfigured. ▲

The Walker Richer & Quinn bulletin board has a number of IBM keyboard mapping files; the number for the BBS is shown on page iii.

Setup for an HP 3000

The table below shows setup values for communicating with an HP 3000.

Setup Dialog Box or RCL	Field Name	Value
Datacomm	Parity	7/SPACE
Advanced Datacomm	Receive Pacing	NONE
Advanced Datacomm	Transmit Pacing	NONE
Keyboard	Local Echo	Cleared
SET ENQ-ACK	N/A	YES
SET HOST-PROMPT	N/A	"^Q"*

Setup for Dow Jones or Other Information Services

The table below shows setup values for communicating with the Dow Jones service. Other information services require similar settings, although most require that the Parity list box be set to *NONE*.

Setup Dialog Box	Field Name	Value
Datacomm	Parity	7/EVEN
Advanced Datacomm	Receive Pacing	NONE
Advanced Datacomm	Transmit Pacing	NONE
Keyboard	Local Echo	Cleared

* This sets a ^{DC1} character as the host prompt. To reset this field to its default value (no host prompt), enter SET HOST-PROMPT "^@".

Reflection Menu Reference

This section provides a reference to the commands available from Reflection menus, and their corresponding dialog boxes. It also tells you where to find more information about the procedures associated with specific menu commands.

When a menu command or a dialog box option has a Reflection command language equivalent, this is shown after the list of the option's values. When an option has a DEC control function equivalent and mnemonic (a convenient "word" for remembering the name of the function), this is also provided.

For a complete reference of all control functions supported by Reflection, see Section 7, "Control Functions" starting on page 523.

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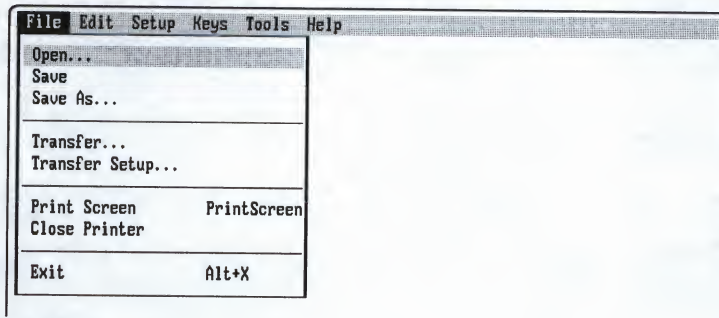
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File Menu

The File menu lists commands for managing Reflection files and performing activities such as transferring a file or saving a Reflection configuration file. This menu also contains commands for controlling the printing of text displayed on the screen.

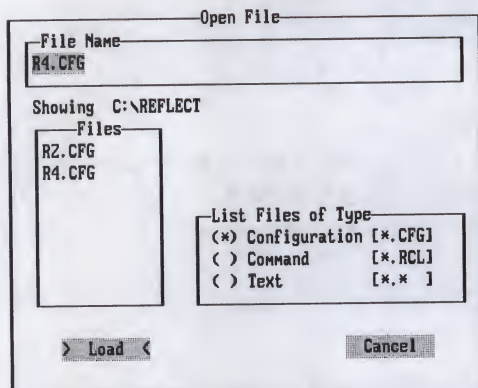


File Menu

Open

Choose Open to display the Open File dialog box. Use this dialog box to load a configuration file, run a Reflection command file, or display a text file.

From the List Files of Type option buttons, select the type of file you want to open. Then type a filename in the File Name text box, or select one from the Files list box, and click the command button (or press **Enter** **↵**). Notice that the action taken by the command button changes depending on the type of file you have selected.



Open File Dialog Box

File Name

Use the File Name text box to type the name of the file you wish to open. You must also include a path if the file is not located in the current directory indicated by the Showing field. You can use this text box to change the current directory by typing the new drive and directory name and pressing **(Enter ↵)**. For example, to see the files in a directory named Work on network drive K, you would enter `K:\WORK`.

The File Name text box also supports wildcard searches using the `*` and `?` characters. For example, if you type `*.DOC` in the list box and press **(Enter ↵)**, this will display all files with the `.DOC` extension for the current directory in the list box.

Showing

This read-only field indicates the location of the files shown in the Files list box. If you change drives or directories in the File Name text box, the new path is indicated by this field.

Files

Use this list box to select a file to open. When you select a file from this list, its name appears in the File Name text box. If you want to see a list of files in another drive or directory, use the File Name text box to change the path.

List Files of Type

Each List Files of Type option button has a filter that determines which files display in the Files list box:

Configuration (*.CFG)

This option button displays Reflection configuration files with the .CFG file extension in the File Name list box (the command button changes to Load). Use this option to load a configuration file and set up Reflection with the parameters and terminal preferences contained in this file.

Command (*.RCL)

This option button displays Reflection Command Language files with the .RCL extension in the File Name list box (the command button changes to Run). Use this option to execute a Reflection command file.

Text (*.*)

This option button displays all files in the File Name list box (the command button changes to Type). Use this option to display the contents of a text file on the terminal screen. The file is typed starting at the cursor location.

To stop the screen from scrolling while a file is being written to the display, press **(Ctrl)-(S)**. Press **(Ctrl)-(Q)** to resume scrolling. To cancel the output while lines are being written to the display, press **(Ctrl)-(Y)**.

If the file is larger than display memory, Reflection deletes lines from the top of display memory as it fills up. Only the portion of the file that fits in display memory is present at any time. The amount of the file retained is determined by the size of Reflection's display memory (see page 244).

Values: *Configuration* (default)

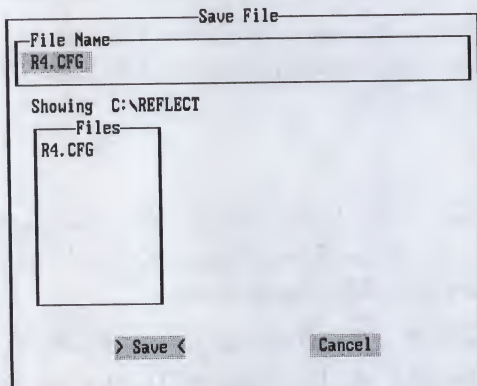
Command

Text

Save

Choose Save to automatically save your current Reflection settings to the configuration (.CFG) file you currently have open. The name of the current configuration file is displayed on the File menu to the right of the Save command.

This command saves your settings without prompting for a filename, with one exception: if you have not saved a configuration file in the current directory, the Save command opens the Save File dialog box with a proposed configuration filename of R2.CFG for Reflection 2, and R4.CFG for Reflection 4. You may accept the proposed filename, type a new one in the File Name text box, or select an existing filename from the Files list box.



Save File Dialog Box

The following items are saved to a configuration file with the Save command:

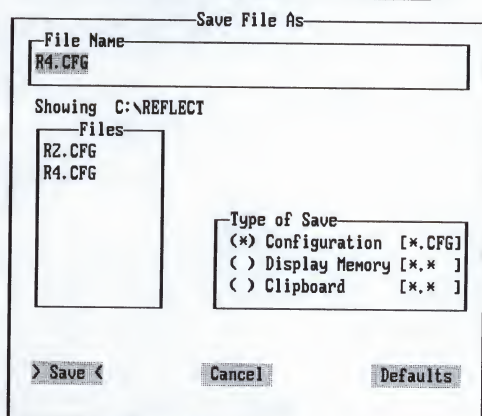
- ▲ Values in the Setup menu's dialog boxes.
- ▲ Values in the File Transfer Setup dialog box.
- ▲ Most values changed using SET commands; type `VERIFY CHANGED` at the command line and press `(Enter ↵)` to see a list of changed SET commands and their modified values.

Note: The Save command does not save your host session. ▲

Save As

Choose Save As to open the Save File As dialog box. Use this dialog box to save your current Reflection configuration settings to a configuration file other than the one you currently have open, and to save display memory or text copied in the Clipboard to a file.

From the Type of Save option buttons, select the type of file you want to save. Then type a filename in the File Name text box, or select one from the Files list box, and click the Save button (or press **Enter**).



Save File As Dialog Box

File Name

Use the File Name text box to type the name of the file you wish to save. You must also include a path if the file is not located in the current directory indicated by the Showing field. You can use this text box to change the current directory by typing the new drive and directory name and pressing **Enter**. For example, to see the files in a directory named Work on network drive K, you would enter `K:\WORK`.

The File Name text box also supports wildcard searches using the `*` and `?` characters. For example, if you type `*.DOC` in the text box and press **Enter**, this will display all files with the .DOC extension for the current directory.

Showing

This read-only field indicates the location of the files shown in the Files list box. If you change drives or directories in the File Name text box, the new path is indicated by this field.

Files

Use this list box to select a file to save. When you select a file from this list, its name appears in the File Name text box. When you choose Save, message box will ask whether you want to replace an existing file with the new one. If you want to see a list of files in another drive or directory, use the File Name text box to change the path.

Type of Save

Each Type of Save option button has a filter that determines which files display, and therefore which type of file you can save:

Configuration (*.CFG)

This option button displays Reflection configuration files with the .CFG file extension in the File Name list box, and puts the name of the current configuration file in the text box. If you have not yet saved a configuration file, the default filename R2.CFG is proposed for Reflection 2, and R4.CFG for Reflection 4.

Use this option of save a configuration file to a different name. If a file already exists with the same name, you are asked whether you want to replace it, or cancel and enter a new name.

Display Memory (*.*)

This option button displays all files in the File Name list box. Use this option to save the contents of display memory to a disk file. If a file already exists with the same name, you are asked whether you want to overwrite it, append the display memory to it, or cancel and enter a new name. This option is equivalent to using Reflection's MSAVE command.

The amount of data stored in display memory is controlled by the Requested Display Memory text box in the Advanced Display Setup dialog box. See page 244.

Clipboard (*.*)

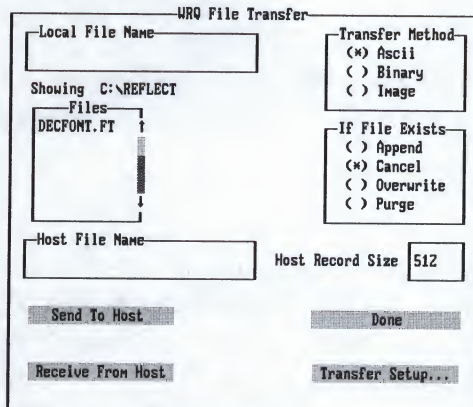
This option button displays all files in the File Name list box. Use this option to save text that has previously been copied to the Clipboard using the Copy command. If a file already exists with the same name, you are asked whether you want to overwrite it, append the text to it, or cancel and enter a new name. See page 354 for information on copying text to the Clipboard.

Values: *Configuration* (default)
Display Memory
Clipboard

Transfer

Choosing Transfer from the File menu displays the File Transfer dialog box. Use this dialog box to transfer files between a host computer and a PC. Before you can transfer files, you must configure Reflection's File Transfer Setup dialog box described on page 189.

The title of the File Transfer Dialog box indicates which file transfer protocol you have selected in the File Transfer Setup dialog box. For example, when WRQ (the default) is selected as the file transfer protocol, the title of this dialog box is *WRQ File Transfer*. The appearance of this dialog box will vary depending on the transfer protocol you have selected.



WRQ File Transfer Dialog Box

For information on how to transfer files using a particular protocol, refer to the following table.

"File Transfers Using the WRQ Protocol"	page 391
"File Transfers Using Kermit"	page 421
"File Transfers Using Zmodem"	page 431
"File Transfers Using Xmodem"	page 441
"File Transfers Using FTP"	page 449
"File Transfers Using the OLD-WRQ Protocol"	page 469

Local File Name

Use the Local File Name text box to type the name of the PC file you want to transfer to the host or receive from the host. The local PC filename, whether *source* or *destination*, must satisfy DOS syntax rules. You can include a drive specifier, path name, and extension in this box. The local filename is optional if you are receiving a file from the host.

You can use this text box to change the current directory by typing the new drive and directory name and pressing (Enter ↵). For example, to see the files in a directory named Work on drive D, you would enter `D:\WORK`.

Using the WRQ protocol, wildcards can specify a group of PC files to be sent to the host; see page 395. Wildcards can also be used with the *Kermit*, *Zmodem*, and *FTP* protocols.

Showing

This read-only field indicates the location of the files shown in the Files list box. If you change drives or directories in the Local File Name text box, the new path is indicated by this field.

Files

Use this list box to select a file to transfer. When you select a file from this list, its name appears in the Local File Name text box. If you want to see a list of files in another drive or directory, use the Local File Name text box to change the path.

Host File Name

Use this text box to enter the name of the host file you want to receive from the host, or transfer to the host. The host filename, whether source or destination, must satisfy host syntax rules. Using the *WRQ* or *FTP* protocol, host wildcard characters can specify a group of host files to be received. The host filename is optional if you are sending a file or files to the host.

For VAX/VMS transfers with the *WRQ* and *OLD-WRQ* protocols, the host filename can include additional file disposition and creation information (called *qualifiers*). See page 404 for *WRQ* protocol qualifiers and page 472 for *OLD-WRQ* protocol qualifiers.

Send To Host

After assigning a Local File Name and an optional Host File Name, use this command button to transfer the local file or files to the host.

Receive From Host

After assigning a Host File Name and an optional Local File Name, use this command button to transfer the host file or files to the PC.

Note: If you are receiving a host file using the Kermit protocol, the function of this command button is affected by the setting of the Kermit Host Mode list box (page 208) in the File Transfer Setup dialog box. ▲

Transfer Method

Use the Transfer Method option buttons to choose a file transfer method other than the default for the particular transfer protocol you are using. You can change the default that appears here by changing the value in the Default Method list box in the File Transfer Setup dialog box (page 190).

Values: *ASCII* (default for *WRQ*, *FTP* and *OLD-WRQ*)
Binary (default for *Kermit*, *Zmodem* and *Xmodem*)
Image (works only with the *WRQ* and *OLD-WRQ* protocols)

ASCII

If you want to simply transfer a text file from your PC to a host computer, or from the host to your PC, select *ASCII* as the file transfer method. Data is transferred according to the parameters in the ASCII File Transfer Options Setup dialog box (see page 196).

In general, use the ASCII method if a file has been created with a PC text editor, or if a host file can be opened and read in a host text editor like EDT. Word processing documents must be saved as *text only* before they can be transferred using the ASCII method, since host-based text editors cannot interpret application-specific formatting data. If another PC is the final destination of the PC file to be transferred, use the binary method described next.

Binary

If your goal is to transmit a file between two PCs via a host computer, such as a word processing file or a non-text file, use the binary method. Binary is also often appropriate for transfer between two hosts via a PC.

Image

Image transfer allows you to move a file between two VAX/VMS hosts via a PC. The file remains usable by VAX applications and its Record Management System (RMS) attributes are preserved.

An indexed file, an .OBJ file, or an .MAI file, for example, are all recreated correctly by using the image transfer method. This method appends file attribute information to the file on the PC and then uses this information when recreating the file on the VAX.

On a UNIX system, image transfers preserve user, group, and mode information. See the discussion of these file attributes in the *Reflection Command Language* manual.

Note: This method works only with the WRQ protocol. If you select this method for an other protocol, a binary transfer will occur instead. ▲

If File Exists

Use these option buttons to tell Reflection what to do if the local file or host file being transferred already exists on the destination system.

Values: *Cancel* (default)

Overwrite

Append

Purge

Note: Additional options are available with the Zmodem file transfer protocol. See page 211. ▲

Cancel

The behavior of *Cancel* depends on the direction of the transfer.

Sending Files to the Host. A file transfer to the VAX is cancelled only if an existing file version number is also specified. Otherwise, a new file with the same name is created, but with a version number one greater than the highest version number of the existing file. This is true only of transfers *to* the host, not of transfers from the VAX to the PC.

If the file is part of a wildcard set, no other files are transferred after a duplicate is found.

Receiving Files. The file transfer is cancelled when a file with the specified name already exists. If the file is part of a wildcard set, no other files are transferred to the PC after a duplicate is found.

Delete

The behavior of *Delete* depends on the direction of the transfer.

Sending Files to the Host. If you send a PC file to the VAX using *Delete*, existing versions of the file on the host are purged. If, for example, you send NOTES.TXT to the host, and NOTES.TXT;2 and NOTES.TXT;3 already exist, a successful transfer results in a single file on the host called NOTES.TXT;4.

If you send a PC file to a UNIX host using *Delete*, a host file matching the local filename is deleted (similar to the DOS file system).

Receiving Files. When transferring to the PC, this option deletes the specified file on the PC, if it exists.

Append

The behavior of *Append* depends on the direction of the transfer.

Sending Files to the Host. When transferring a file to the VAX, *Append* adds the data in the PC file to the VAX file with the highest version number.

Receiving Files. When receiving a file with *Append*, the host file is appended to an existing PC file. If no such file exists, it is created.

Purge

This option is available only for the WRQ transfer protocol. For file transfers with a VAX host, *Purge* creates a new file using the next version number and deletes any existing files. If there are no existing files, the version number "1" is used. For file transfers with a UNIX host, *Purge* deletes an existing UNIX file of the same name before the transfer.

Host Record Size

Use this text box to specify the default host file record size; it applies to the WRQ and OLD-WRQ protocols only. The default value changes according to the file transfer protocol being used. The value serves as an upper limit for the amount of data to be placed in the records of a file. Records longer than the maximum record size are split into multiple records.

With the OLD-WRQ protocol, Host Record Size applies to both ASCII and binary file transfers; with the WRQ (default) protocol, only binary transfers are affected by the value of this field.

If you are in doubt as to a file's size, check other host files used by the same program. To do this on the VAX, for example, type `DIR/FULL <filename>` to see the maximum record length for the given <filename>. This command gives the length of every record for fixed-length record files, and the length of the longest record(s) for variable-length record files.

Done

Choose this command button when you are done transferring files. This closes the File Transfer dialog box.

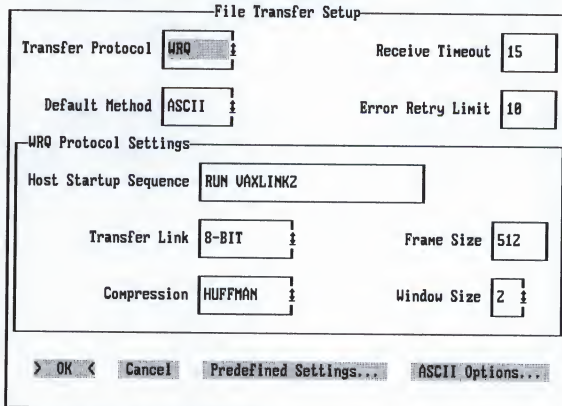
Transfer Setup

Choose this command button if you need to make any changes to Reflection's file transfer settings. This opens the File Transfer Setup dialog box described next.

File Transfer Setup

Choose Transfer Setup from the File menu to display the File Transfer Setup dialog box. (You can also reach this dialog box by choosing the Transfer Setup button in the File Transfer dialog box.) If you are connecting to a VAX/VMS host, you should be able to transfer files with the default file transfer settings. If you are connecting to a UNIX host, or need to modify the default file transfer settings, use this dialog box.

Note: Reflection provides a collection of predefined settings for transferring files to supported hosts in a variety of situations. You can set up Reflection for file transfers in one step by choosing the Predefined Settings button, instead of making changes in dialog boxes or issuing SET commands on the command line. See page 191 for information on the predefined file transfer settings. ▲



The dialog box is titled "File Transfer Setup". It contains several fields and buttons:

- Transfer Protocol:** A dropdown menu showing "WRQ".
- Receive Timeout:** A text box containing "15".
- Default Method:** A dropdown menu showing "ASCII".
- Error Retry Limit:** A text box containing "10".
- WRQ Protocol Settings:** A section containing:
 - Host Startup Sequence:** A text box containing "RUN VAXLINK2".
 - Transfer Link:** A dropdown menu showing "8-BIT".
 - Frame Size:** A text box containing "512".
 - Compression:** A dropdown menu showing "HUFFMAN".
 - Window Size:** A text box containing "2".
- Buttons:** At the bottom, there are four buttons: "> OK <", "Cancel", "Predefined Settings...", and "ASCII Options...".

File Transfer Setup Dialog Box

Transfer Protocol

Select the file transfer protocol you want to use from this list box. Your choice here determines the behavior of the Transfer command on the File menu (page 183). By default, this list box is set to *WRQ*, and the bottom half of the dialog box displays the *WRQ* Protocol Settings. The fields in the top half of the dialog box are common to all the transfer protocols (see “Common Settings” below). The information in the lower half changes, depending on the protocol you have selected:

Transfer Protocol	See Page
<i>WRQ</i> (default)	200
<i>Kermit</i>	206
<i>Zmodem</i>	209
<i>Xmodem</i>	213
<i>FTP</i>	214
<i>OLD-WRQ</i>	215

Reflection command language equivalent:

```
SET TRANSFER-PROTOCOL <value>
```

The advantages of the *WRQ* protocol are presented on page 374.

Common Settings

The following settings are common to the *WRQ*, *Kermit*, *Zmodem*, *Xmodem*, *FTP*, and *OLD-WRQ* file transfer protocols (except where noted):

Default Method

When you choose the Transfer command from the File menu, or transfer files using command language, the file transfer method defaults to the value you assign to this list box. See page 185.

Values: *ASCII* (default)

BINARY

IMAGE

Reflection command language equivalent:

```
SET TRANSFER-METHOD {ASCII | BINARY | IMAGE}
```

Note: The *IMAGE* value applies only to the *WRQ* protocol. ▲

Receive Timeout

This text box determines the maximum number of seconds that Reflection should wait for a block of data or an acknowledgement from the host when transferring a file. If there is no response within the period specified, the program attempts to resynchronize. The error retry limit (below) determines when the transfer command no longer attempts to retransmit the block.

Note: This text box does not apply to the FTP file transfer protocol. ▲

Values: 1–9999

Default: 15 (seconds)

Reflection command language equivalent:

SET RECEIVE-TIMEOUT <value>

Error Retry Limit

This text box tells Reflection how many consecutive times to attempt to correct an error before abandoning the transfer. If an error condition occurs many times consecutively, you may have an insurmountable communications problem. With this parameter, you define the point at which an error state is declared unsolvable.

Note: This text box does not apply to the FTP file transfer protocol. ▲

Values: 1–9999

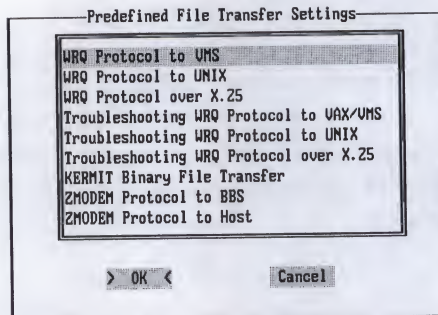
Default: 10 (retries)

Reflection command language equivalent:

SET RETRY-LIMIT <value>

Predefined Settings

Choosing this command button opens the Predefined File Transfer Settings dialog box. This dialog box lets you configure Reflection for file transfer in one simple step. Selecting an item here changes the appropriate values in the File Transfer Setup dialog box for the indicated environment. If a value not shown in the File Transfer Setup dialog box needs to be changed, a message box tells you the item or items that will change. After selecting a predefined setting, you must choose Save from the File menu (see page 180) if you want to retain these changes in your configuration file for future file transfers.



Predefined File Transfer Settings Dialog Box

The predefined troubleshooting protocols are helpful if you are having problems transferring files using the standard predefined settings. These troubleshooting settings slow down the rate at which data is transferred, but increase the likelihood of successfully completing a file transfer despite problems with data communications.

WRQ Protocol To VAX/VMS

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Host Startup Sequence is set to *RUN VAXLINK2*
- ▲ Frame Size is set to *512*
- ▲ Window Size is set to *2*

The following changes are made in other dialog boxes:

- ▲ Transmit Pacing is set to *XON/XOFF* in the Advanced Datacomm Setup dialog box
- ▲ The Change Tabs to Spaces check box is selected in the ASCII File Transfer Options Setup dialog box

The following SET command change is made:

- ▲ SET LINE-DELAY 0

WRQ Protocol To UNIX

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Host Startup Sequence is set to *unxlink2*
- ▲ Frame Size is set to *128*
- ▲ Window Size is set to *2*

The following changes are made in other dialog boxes:

- ▲ Transmit Pacing is set to *XON/XOFF* in the Advanced Datacomm Setup dialog box
- ▲ The Change Tabs to Spaces check box is cleared in the ASCII File Transfer Options Setup dialog box

The following changes are made to SET commands:

- ▲ SET HOST-PROMPT ^@
- ▲ SET HOST-STARTUP *unxlink2*
- ▲ SET HOST-START-WRQ *unxlink2*
- ▲ SET LINE-DELAY 0

WRQ Protocol Over X.25

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Frame Size is set to *512*
- ▲ Window Size is set to *2*

The following change is made in the Advanced Datacomm Setup dialog box:

- ▲ Transmit Pacing is set to *XON/XOFF*

Troubleshooting WRQ Protocol To VAX/VMS

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Host Startup Sequence is set to *RUN VAXLINK2*
- ▲ Transfer Link is set to *7-BIT*
- ▲ Frame Size is set to *80*
- ▲ Window Size is set to *1*

The following changes are made in other dialog boxes:

- ▲ Transmit Pacing is set to *XON/XOFF* in the Advanced Datacomm Setup dialog box
- ▲ The Change Tabs to Spaces check box is selected in the ASCII File Transfer Options Setup dialog box

The following SET command change is made:

- ▲ `SET LINE-DELAY 1`

Troubleshooting WRQ Protocol To UNIX

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Host Startup Sequence is set to *unxlink2*
- ▲ Transfer Link is set to *7-BIT*
- ▲ Frame Size is set to *80*
- ▲ Window Size is set to *1*

The following changes are made in other dialog boxes:

- ▲ Transmit Pacing is set to *XON/XOFF* in the Advanced Datacomm Setup dialog box
- ▲ The Change Tabs to Spaces check box is cleared in the ASCII File Transfer Options Setup dialog box

The following SET commands change is made:

- ▲ SET LINE-DELAY 1

Troubleshooting WRQ Protocol Over X.25

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *WRQ*
- ▲ Transfer Link is set to *7-BIT*
- ▲ Frame Size is set to *64*
- ▲ Window Size is set to *1*

The following change is made in the Advanced Datacomm Setup dialog box:

- ▲ Transmit Pacing is set to *XON/XOFF*

The following SET commands change is made:

- ▲ SET LINE-DELAY 1

Kermit Binary File Transfer

When you choose this option, the following values are used in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *Kermit*
- ▲ Default Method is set to *Binary*

Zmodem Protocol to BBS

Use this predefined setting to transfer files to and from a computer bulletin board. When you choose this option, the following values are changed in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *Zmodem*
- ▲ The Default Method is set to *Binary*
- ▲ The Host Receive Startup Sequence text box is left blank
- ▲ The Host Send Startup Sequence text box is left blank
- ▲ The Translate Characters check box is cleared

Zmodem Protocol to Host

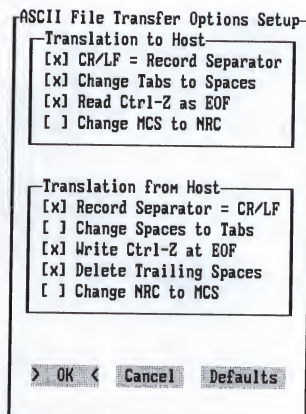
When you choose this option, the following values are changed in the File Transfer Setup dialog box:

- ▲ Transfer Protocol is set to *Zmodem*
- ▲ The Host Receive Startup Sequence text box is set to *rz*
- ▲ The Host Send Startup Sequence text box is set to *sz*
- ▲ The Translate Characters check box is selected

ASCII Options

Choose the ASCII Options button in the File Transfer Setup dialog box to display the ASCII File Transfer Options Setup dialog box. The settings for these check boxes apply only when you transfer files using the ASCII transfer method, either via the File Transfer dialog box or Reflection's command language. Reflection ignores all of these fields when performing a binary file transfer. (See page 185 for a discussion of binary vs. ASCII file transfer methods.)

These settings also apply to ASCII transfers using *Kermit*, *Zmodem*, *FTP*, and *OLD-WRQ* protocols, as well as the FTP transfer commands at the Connection Manager prompt.



ASCII File Transfer Options Setup Dialog Box

Translation to Host

The check boxes in the Translation to Host group box apply when you send files from the PC to the host.

CR/LF = Record Separator

Selecting this check box tells the host program to generate a new record every time it receives a carriage return/linefeed sequence.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

```
SET CR/LF=SEPARATOR {YES | NO}
```

Change Tabs to Spaces

Select this check box if you want the tab characters in the PC file to be expanded to spaces in the host file. The system will replace each tab character with the number of spaces necessary to fill out to the next tab stop, where tab stops are assumed in column 9 and every eighth column thereafter.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

```
SET TABS-TO-SPACES {YES | NO}
```

Read Ctrl-Z as EOF

On the PC, ASCII text files normally end with a Ctrl-Z (^Z or ASCII decimal value 26) character. When this check box is selected, file transfer uses Ctrl-Z as the end-of-file marker and strips it from the file being sent. If you do *not* want the file transfer to use Ctrl-Z as an end-of-file marker, clear this check box; the character count in the file directory is used to determine the file length.

Values: *Selected* (the default)
Cleared

Reflection command language equivalent:

SET CTRL-Z=EOF {YES | NO}

Change MCS to NRC

This check box determines character set translation during ASCII file transfers to the host computer. When this check box is selected, characters are translated from an 8-bit format to a 7-bit format.

Values: *Cleared* (the default)
Selected

Reflection command language equivalent:

SET MCS-TO-NRC {YES | NO}

Translation from Host

The check boxes in the Translation from Host group box apply when you send files from the host to the PC.

Record Separator = CR/LF

Select this check box if you want records received from the host to be separated by a carriage return/linefeed on the PC.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET SEPARATOR=CR/LF {YES | NO}

Change Spaces to Tabs

Select this check box if you want tab characters to replace consecutive spaces. Many software products on the PC understand how to use embedded tabs to indicate the standard 8-column tab stops. Selecting this can save considerable disk space.

Note: This field is also used outside of file transfer to control replacement of tabs with spaces whenever Reflection writes to disk: during logging or saving display memory (MSAVE). ▲

Values: *Cleared* (the default)
Selected

Reflection command language equivalent:

SET SPACES-TO-TABS {YES | NO}

Write Ctrl-Z at EOF

On the PC, ASCII text files normally end with a Ctrl-Z (^Z or ASCII decimal value 26) character. If you want a Ctrl-Z character to be added to the file when it is received, select this check box. Many PC programs require the Ctrl-Z marker.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET WRITE-CTRLZ {YES | NO}

Delete Trailing Spaces

Some host text files use fixed-length records to delimit lines and pad the end of each record with blanks. Most PC text processing programs use CR/LF (carriage return, linefeed) to delimit lines and paragraphs, and do not need blanks preceding a delimiter. You can save a great deal of disk space by leaving this check box selected. The Record Separator = CR/LF check box must also be selected.

Note: This field is also used outside of file transfer whenever Reflection writes to disk: when logging or saving display memory (MSAVE). ▲

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET DELETE-TRAILING-SPACES {YES | NO}

Change NRC to MCS

This check box determines character set translation during ASCII file transfers from the host computer. When this check box is selected, characters are translated from a 7-bit format to an 8-bit format.

Values: *Cleared* (the default)
Selected

Reflection command language equivalent:

SET NRC-TO-MCS {YES | NO}

WRQ Protocol Settings

The WRQ protocol is Reflection's default protocol for file transfer, and should be used in most circumstances. WRQ allows wildcard file transfers in either direction, and files can contain information other than ASCII characters.

The settings specific to the WRQ protocol are described here. The first four fields in the File Transfer Setup dialog box are discussed in "Common Settings" on page 190. Procedures for transferring files using the WRQ protocol are explained in starting on page 391.

When you select WRQ from the Transfer Protocol box, the other fields in the WRQ Protocol Settings group box appear as follows:

Host Startup Sequence

Each time you start a file transfer using the WRQ protocol, Reflection transmits a host startup sequence, as entered in this text box, to the host computer. This tells the host to run the Reflection host transfer program, using the name given when it was uploaded to the host. See "Uploading a WRQ Host Program" on page 381 for instructions on checking for and uploading the program to the host.

The default value for Host Startup Sequence is *RUN VAXLINK2* for transfers to a VAX host. For transfers to a UNIX host, enter *unxlink2* (in lowercase letters) in this text box. You can also add parameters to the host startup sequence that change the timeout period and provide other services; see page 407 for VAX hosts and page 419 for UNIX hosts.

Value: <A string of up to 31 characters>

Default: RUN VAXLINK2

unxlink2 (UNIX transfer)

Reflection command language equivalent:

SET HOST-STARTUP <value>

SET HOST-START-WRQ <value>

You can save separate host startup sequences for the WRQ and OLD-WRQ protocols in the same configuration file. See page 413 for VAX hosts, and page 420 for UNIX hosts.

Transfer Link

The value of this field is ignored if you're using "fast file transfer," described on page 374.

This list box affects the speed of your file transfer. Unless you're having trouble transferring files, leave this field set to 8-BIT (the default). In some environments, however, you may find you need to use a slower method that translates non-printable ASCII characters to printable (and more reliably transferred) characters. These conversion options do not alter the data sent.

The field values are listed here and discussed in detail beginning on this page; the Reflection command language equivalents are discussed below.

Values: 8-BIT (default)

7-BIT

USER-DEF

Transfer Link: 8-BIT

This is the default value and provides the fastest file transfer. Only the characters in the following table are translated:

Description	String	Hex Value
Carriage return	^M	0D
DC1 (XON)	^Q	11
DC3 (XOFF)	^S	13
End of medium	^Y	19
Pound sign	#	23
Ampersand	&	26

UNIX file transfer modifies the following additional characters:

Description	String	Hex Value
Substitute	^Z	1A
Null	^@	00
Linefeed	^J	0A
^Q, high bit	P ₁	91
^S, high bit	S _F	93
Decimal 128		80
Decimal 255		FF

In addition, the start of frame and end of frame characters are translated. By default, they are ^B (STX) and ^C (ETX), respectively.

Setting the value of Transfer Link to 8-BIT requires an 8-bit data path. Other setup parameters in Reflection can affect your data path, overriding the displayed 8-BIT setting:

- ▲ If you change Parity to a value other than 8/NONE in the Datacomm Setup dialog box, you no longer have an 8-bit data path. All characters except those for the start and end of frame are translated.
- ▲ When Mode is set to VT52 or VT102 in the General Setup dialog box, all received data is forced to 7-bits.

For an 8-bit transfer, the associated SET parameters have these values:

```
SET TRANSFER-PRESENTATION "A"
SET TRANSFER-START-CHAR  "^B"
SET TRANSFER-END-CHAR   "^C"
```

Transfer Link: 7-BIT

When 7-BIT is chosen, each data character including binary data, is examined and, if necessary, modified to ensure that it is a non-control (printable) ASCII character. This data modification is reversed by the recipient (host computer or PC), so that the data being transferred is not affected. Each packet starts with an opening parenthesis and ends with a closing parenthesis. Selecting 7-BIT slows down the transfer. If you are using CTERM, only 7-bit file transfers are supported.

For an 7-bit transfer, the associated SET parameters have these values:

```
SET TRANSFER-PRESENTATION "C"  
SET TRANSFER-START-CHAR "("  
SET TRANSFER-END-CHAR ")"
```

Transfer Link: User-Defined

Some intermediate devices or drivers filter out a wider variety of non-printable ASCII characters than the default set of characters that are converted by the 8-BIT option; this also applies to certain host applications and network environments. If you know which characters are being filtered out by the intermediary device, use the SET parameters below to specify additional character translation beyond the base set of characters translated using the 8-BIT option.

The value of Transfer Link is automatically changed to *USER-DEF* if the SET parameters for transfer presentation, or start and end of frame characters, do not correspond to the values for 8-BIT or 7-BIT.

The SET parameters that are involved in a user-defined link are:

```
SET TRANSFER-PRESENTATION "B"  
SET TRANSFER-START-CHAR "<control character>"  
SET TRANSFER-END-CHAR "<control character>"  
SET TRANSFER-EXTRA-CHARS "<string>"
```

The following is an explanation of the relationship of these SET parameters to the value of Transfer Link:

Changing the Transfer Presentation: The value of the SET TRANSFER- PRESENTATION parameter is one factor that determines your Transfer Link. Use "A" for 8-bit or "C" for 7-bit file transfers. If you use SET TRANSFER-PRESENTATION "B", characters are translated as they would be for 8-bit presentation, and the Transfer Link is automatically set to *USER-DEF*. Up to 32 additional characters can then be translated using the following command:

```
SET TRANSFER-EXTRA-CHARS "<string>"
```

The *<string>* must consist of one or more characters with an ASCII value of less than 32 or more than 127, for example, SET TRANSFER-EXTRA-CHARS "^U".

Start and End of Frame Characters: The symbol ^B (start of text) is normally used to begin data packets, and ^C (end of text) is normally used to end them. Alternate characters are required if the default characters do not remain intact when passed through intermediate devices. You can change the start and end of frame characters from the command line, for example:

```
SET TRANSFER-START-CHAR "("
SET TRANSFER-END-CHAR ")"
```

The value for either of these SET parameters must be a control character (for example, ^L) or a parenthesis (as in the example above). You cannot use the following control characters: ^@, ^M, ^Q, ^S, ^Y.

UNIX Transfer: UNIX transfers convert the ^Z sequence so that systems using it as a job control "suspend" can function correctly. If you or your system manager has redefined a suspend as ^U, for example, make the following changes on the command line:

```
SET TRANSFER-PRESENTATION "B"
SET TRANSFER-EXTRA-CHARS "^U"
```

Compression

File compression usually speeds up file transfers. Huffman compression uses more processing power on the host and the local computer, but compresses data most effectively. For most users, the default value of *HUFFMAN* is recommended. Users with less computing power might prefer to use *RUN-LENGTH* or *NONE*. You can try comparing the transfer time using these different types of compression.

If you're using "fast file transfer," described on page 374, the value in this list box is ignored.

Values: *HUFFMAN* (default)
RUN-LENGTH
NONE

Reflection command language equivalent:
 SET COMPRESSION <value>

Frame Size

This text box tells the file transfer program how many bytes of data to transfer at a time (the “fast file transfer” feature ignores this field).

The transfer program breaks a file into packets, or frames, that are transmitted one at a time until the entire file has been transmitted. You specify the number of data bytes each frame contains. There need be no correlation between this field and the size of the records or blocks on the host computer.

A large frame size is more efficient when there are few transmission errors. Therefore, the value you assign to this text box should depend on the likelihood of transmission errors. This is especially important if you’re communicating to the host over a modem, which has a greater chance of error. Use the default value in most situations.

For UNIX file transfers, the Frame Size multiplied by the Window Size (described next) cannot exceed the system-imposed limit on the number of characters that can be stored in the input queue. This limit is dependent on your configuration, but is usually at least 256.

The size of the frame affects the speed of transfers: too small a frame results in long transmission times because of the overhead that occurs for each frame, and too large a frame may increase the elapsed time because the chance of error increases with frame size.

Values: 32–2048

Default: 512

Reflection command language equivalent (WRQ protocol only):

SET TRANSFER-FRAME-SIZE <value>

Window Size

The WRQ file transfer protocol is a *sliding-window* protocol, which means that you can set the number of packets that one side sends before receiving an acknowledgment.

For UNIX file transfers, the Window Size multiplied by the Frame Size (described above) cannot exceed the system-imposed limit on the number of characters that can be stored in the input queue. This limit is dependent on the particular implementation, but is usually at least 256.

Values: 1–4 (default 2)

Reflection command language equivalent:

SET TRANSFER-WINDOW-SIZE <value>

Kermit Protocol Settings

Kermit is a public domain protocol that can be used to transfer files to and from environments that do not have the Reflection host file program available. When you select *Kermit* from the Transfer Protocol list box, the File Transfer Setup dialog box changes to look like this:

The screenshot shows a dialog box titled "File Transfer Setup". It contains several fields and buttons. The "Transfer Protocol" field is set to "KERMIT". The "Default Method" field is set to "BINARY". The "Receive Timeout" field is set to "15". The "Error Retry Limit" field is set to "10". Below these fields is a section titled "Kermit Protocol Settings" which contains four fields: "Send Start Character" set to "^A", "Receive Start Character" set to "^A", "Checksum" set to "1-BYTE", and "Kermit Host Mode" set to "AUTO". The "Packet Size" field is set to "94". At the bottom of the dialog box are four buttons: "> OK <", "Cancel", "Predefined Settings...", and "ASCII Options...".

File Transfer Setup Dialog Box—Kermit Protocol Settings

The settings specific to the Kermit protocol are described here. The first four fields in the File Transfer Setup dialog box are discussed in "Common Settings" on page 190. Procedures for transferring files using the Kermit protocol are explained starting on page 421.

Send Start Character

From this list box, select the first character to be sent in a packet to the host during a Kermit transfer. Normally this character does not need to be set, but some systems cannot use the default start-of-header (SOH or ^A) character when sending packets.

Values: ^A (default)

<ASCII control characters 0–31>

Reflection command language equivalent:

SET KERMIT-SEND-START "<control character>"

See page 529 in the Appendix for a table of ASCII control codes.

Receive Start Character

From this list box, select the first character to be received in a packet from the host during a Kermit transfer. Normally this character does not need to be set, but some systems cannot use the default start-of-header (SOH or ^A) when receiving packets.

Values: ^A (default)

<ASCII control characters 0–31>

Reflection command language equivalent:

SET KERMIT-RECEIVE-START "<control character>"

See page 529 in the Appendix for a table of ASCII control codes.

Packet Size

This text box specifies the desired packet size (in bytes) for Kermit transfers. The actual packet size depends on both the local and remote Kermit programs—if the two systems are configured for different-sized packets, the smaller of the two values is used.

Values: 94 (default)

32–1024

NONE

Reflection command language equivalent:

SET KERMIT-PACKET-SIZE <value>

Checksum

Kermit supports three kinds of error checking: single-byte checksum, double-byte checksum, and 3-byte CRC (cyclical redundancy checking). During file transfers, Reflection uses the level of error checking specified. If the Kermit program at the other end of the transfer does not support that level, single-byte checksum is used. 1-BYTE is fastest, but CRC is safest.

Values: 1-BYTE (default)
2-BYTE
CRC

Reflection command language equivalent:
SET KERMIT-CHECKSUM <value>

Kermit Host Mode

Use this list box to control how Reflection receives files from a Kermit host. This applies only to files that are received when you choose the Receive from Host button in the File Transfer dialog box (page 185). This list box does not affect Kermit file transfers that are executed on the Reflection command line or the Kermit host prompt.

If you select SERVER, Reflection executes a KGET command that receives a file from a remote Kermit program running in server mode. If you select SEND, Reflection issues a KRECEIVE command that receives a file from a Kermit host. With the AUTO option, Reflection first attempts to receive the host file using the KRECEIVE command; if there is one timeout, Reflection then attempts a KGET command.

Values: AUTO (default)
SEND
SERVER

Reflection command language equivalent:
SET KERMIT-HOST-MODE <value>

Zmodem Protocol Settings

Zmodem is a public domain protocol available on many bulletin boards and host systems. When you select *Zmodem* from the Transfer Protocol list box, the File Transfer Setup dialog box changes to look like this:

The screenshot shows the 'File Transfer Setup' dialog box. It has a title bar 'File Transfer Setup'. Inside, there are two main sections. The top section contains 'Transfer Protocol' set to 'ZMODEM', 'Receive Timeout' set to '15', 'Default Method' set to 'BINARY', and 'Error Retry Limit' set to '10'. The bottom section is titled 'Zmodem Protocol Settings' and contains 'Host Receive Startup Sequence' and 'Host Send Startup Sequence' text boxes. Below these are checkboxes for '[] Translate Characters', '[x] Allow Automatic Downloading', and '[] Delete Cancelled Receives'. To the right of these are 'IF Local File Exists' set to 'CANCEL' and 'Packet Size' set to '1024'. At the bottom are buttons for '> OK <', 'Cancel', 'Predefined Settings...', and 'ASCII Options...'.

File Transfer Setup Dialog Box—Zmodem Protocol Settings

The settings specific to the Zmodem protocol are described here. The first four fields in the File Transfer Setup dialog box are discussed in “Common Settings” on page 190. Procedures for transferring files using the Zmodem protocol are explained in “File Transfers Using Zmodem” on page 431.

Host Receive Startup Sequence

When you send a file from the PC to the host using the Zmodem protocol, this sequence is transmitted to the host. Enter the name of the program that starts Zmodem receives on the host in this text box. If you do not indicate a receive start-up sequence, you must manually start the host's Zmodem receive program before you can send the local file.

Note: This setting is only necessary when sending files to a host system; it is not required for transferring files to a bulletin board. ▲

Reflection command language equivalent:

```
SET ZMODEM-START-REMOTE-RECEIVE <string>
```

Host Send Startup Sequence

When you receive a file from the host using the Zmodem protocol, this sequence, along with the name of the file to be received, is transmitted to the host. Enter the name of the program that starts Zmodem sends on the host in this text box. If you do not indicate a send startup sequence, you must manually start the host's Zmodem send program before you can receive the host file. For VAX/VMS hosts, this sequence must be defined as a foreign command (see page 411 for an example).

Note: This setting is only necessary when receiving files from a host system; it is not required for downloading files from a bulletin board. ▲

Reflection command language equivalent:

```
SET ZMODEM-START-REMOTE-SEND <string>
```

Translate Characters

When this check box is selected, Reflection translates characters based on the settings in the ASCII File Transfer Options Setup dialog box (see page 196).

Values: *Selected*

Cleared (default)

Reflection command language equivalent:

```
SET ZMODEM-TRANSLATE-CHARS {YES | NO}
```

Allow Automatic Downloading

Keep this check box selected to take advantage of the Zmodem protocol's automatic downloading feature. When you initiate a send (from either a host system or bulletin board), Reflection immediately starts receiving a remote file with the same name as soon as it detects a Zmodem header.

If you clear the Allow Automatic Downloading check box, you must choose Receive From Host in the Zmodem File Transfer dialog box (or enter ZRECEIVE on the command line) to initiate a download.

Note: With automatic downloading, you are not prompted for a file name or a transfer method. ▲

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET ZMODEM-ALLOW-AUTO-DOWNLOAD {YES | NO}

Delete Canceled Receives

If you cancel a transfer in the middle of receiving a file, keep this check box selected to automatically have the partially received file deleted. (Downloads which are aborted without you cancelling are always kept.)

Values: *Selected*
Cleared (default)

Reflection command language equivalent:

SET ZMODEM-DELETE-CANCELLED-FILES {YES | NO}

If Local File Exists

This list box tells Reflection what to do if the file to be received already exists. If the local file does not exist, it is always created with the same date as the file on the remote system. By default, Reflection cancels the transfer if the local file exists.

Values: *Cancel* (default)
Overwrite
Append
Rename
Resume
Update
Use-Remote

Reflection command language equivalent:

SET ZMODEM-DISPOSITION <value>

The If Local File Exists options are:

- Cancel* Cancels the transfer if the local file exists. If the file is part of a wildcard set (files being transferred using wildcards or a string of file names), no other files are transferred to the PC after a duplicate is found unless the CONTINUE command is on.
- Overwrite* Overwrites the existing file on the PC, if it exists, with the new file.
- Append* Appends the remote file to an existing PC file with the same name. If no such file exists, it is created.
- Rename* Renames the file being received if one with the same name already exists. If the extension is less than three characters, Reflection fills out the extension with underscores. Then, the last character of the file's extension is assigned the number 0–9. If a file with the same name already exists, then the last two characters are changed to 10–99. Finally, the same is true for 100–999. If at this point the file still exists, Reflection returns an error.
- Resume* If the local file exists, Reflection assumes it is there as the result of an aborted download. Reflection resumes the file transfer at the point of interruption.
- Update* If the local file exists and its date is older than the remote file, then the file is received (otherwise, no file is transferred).
- Use-Remote* Uses the disposition option specified by the remote system. If the remote system doesn't specify a disposition, the value used by this list box goes back to the default of *Cancel*.

Packet Size

This text box sets the sub-packet size for file transfers; this value tells Zmodem how many bytes of data to transfer at a time. The default of 1024 should be sufficient in most situations.

Values: 32–1024 (default 1024)

Reflection command language equivalent:

```
SET ZMODEM-PACKET-SIZE <value>
```

Xmodem Protocol Settings

Xmodem is a public domain protocol that can be used to transfer files to and from environments that do not have the Reflection host file program available. When you select *Xmodem* from the Transfer Protocol list box, the File Transfer Setup dialog box changes to look like this:

The screenshot shows a dialog box titled "File Transfer Setup". It contains four input fields: "Transfer Protocol" set to "XMODEM", "Receive Timeout" set to "15", "Default Method" set to "ASCII", and "Error Retry Limit" set to "10". Below these is a section titled "Xmodem Protocol Settings" which contains a checkbox labeled "[x] Xmodem CRC Checksum" that is checked. At the bottom of the dialog are four buttons: "> OK <", "Cancel", "Predefined Settings...", and "ASCII Options...".

File Transfer Setup Dialog Box—Xmodem Protocol Settings

There is only one setting specific to the Xmodem protocol; this is described here. The first four fields in the File Transfer Setup dialog box are described in “Common Settings” on page 190.

Xmodem CRC Checksum

Some versions of Xmodem are able to do CRC-error checking (cyclical redundancy checking), which is performed when you keep this check box selected. This is an error detection scheme that uses redundant check bits.

If the Xmodem protocol on the host does not support CRC error-checking, or this check box is cleared, Xmodem uses *checksum* for error-checking. Checksum is a repetitious checking method in which groups of digits are summed, and that sum is checked against a previously computed sum to verify accuracy. The checksum method takes 1 byte and Xmodem CRC takes 2 bytes. Therefore, using checksum means you can send 1 more byte of data per packet (hence speeding up the transfer). However, since checksum is generally less reliable for detecting errors, you should use CRC-error checking when it is available.

Values: *Selected* (default)

Cleared

Reflection command language equivalent:

```
SET XMODEM-CRC {YES | NO}
```

FTP Protocol Settings

When you select *FTP* from the Transfer Protocol list box, the File Transfer Setup dialog box changes to look like this:

File Transfer Setup

Transfer Protocol	FTP	Receive Timeout	15
Default Method	ASCII	Error Retry Limit	10

> OK < Cancel Predefined Settings... ASCII Options...

File Transfer Setup Dialog Box—FTP Protocol Settings

There are no settings specific to the FTP protocol. The first two fields in the File Transfer Setup dialog box are described in “Common Settings” on page 190. Note that the Receive Timeout and Error Retry Limit text boxes are dimmed because they do not apply to the FTP protocol. Procedures for transferring files using the FTP protocol are described starting on page 449.

OLD-WRQ Protocol Settings

When you select *OLD-WRQ* from the Transfer Protocol list box, the File Transfer Setup dialog box looks like this:

The screenshot shows the 'File Transfer Setup' dialog box. At the top, the title bar reads 'File Transfer Setup'. Inside the dialog, there are two main sections. The top section contains four fields: 'Transfer Protocol' with a dropdown menu showing 'OLD-WRQ', 'Default Method' with a dropdown menu showing 'ASCII', 'Receive Timeout' with a text box containing '15', and 'Error Retry Limit' with a text box containing '10'. The bottom section is titled 'Old-WRQ Protocol Settings' and contains two fields: 'Host Startup Sequence' with a text box containing 'RUN VAXLINK' and 'Data Block Size' with a text box containing '478'. At the bottom of the dialog, there are four buttons: '> OK <', 'Cancel', 'Predefined Settings...', and 'ASCII Options...'.

File Transfer Setup Dialog Box—OLD-WRQ Protocol Settings

This section describes the settings specific to the OLD-WRQ protocol. The first four fields in the File Transfer Setup dialog box are described in “Common Settings” on page 190. Procedures for transferring files using the OLD-WRQ protocol are described starting on page 469.

Host Startup Sequence

Each time you start a file transfer using the *OLD-WRQ* protocol, Reflection transmits a host startup sequence, as entered in this text box, to the host computer. This tells the host to run the Reflection host transfer program, using the name given when it was uploaded to the host. See “Uploading a WRQ Host Program” on page 381 for instructions on checking for and uploading the program to the host.

The default value for Host Startup Sequence is *RUN VAXLINK* for transfers to a VAX host. For transfers to a UNIX host, enter *unixlink* (in lowercase) in this text box. You can also add parameters (see page 407) to the host startup sequence that change the timeout period and provide other services.

Value: *<A string of up to 31 characters>*

Default: *RUN VAXLINK*

unixlink (UNIX transfer)

Reflection command language equivalent:

SET HOST-STARTUP <value>

SET HOST-START-OLD <value>

You can save separate host startup sequences for the WRQ and OLD-WRQ protocols in the same command file. See page 474 for more information.

Data Block Size

When a file is transferred, it is broken into packets that are transmitted one at a time until the entire file has been sent. This text box lets you specify the size of each packet of data, in bytes. There does not need to be any correlation between the data block size and the size of the records or blocks on the host computer.

The data block size affects the speed of file transfers. Blocks that are too small can result in long transmission times because of the overhead required for each block (such as codes that start and end each block).

A large block size is more efficient when there are few transmission errors. Therefore, the value you assign here depends on the likelihood of transmission errors. This is especially important if you are connected to the host by modem; a modem has a greater chance of introducing an error.

Values: *64–478 (default 478 bytes)*

Reflection command language equivalent:

SET BLOCK-SIZE <value>

Print Screen

This command prints the text that is visible on the screen. A form-feed after printing is optional and is selected in the Printer Setup dialog box with the Auto Form Feed check box (see page 279).

If you are in graphics mode in Reflection 4, this command performs a graphics print screen by default. To print text only, clear the Print Graphics check box in the Graphics Printing Setup dialog box (see page 265).

The keyboard shortcut is the **PrtSc** key.

Close Printer

When printing to a network printer, this command will flush any data from the printer buffer and send it to the printer. When printing to a file, this command closes the disk file.

Exit

Exits Reflection and returns you to the DOS prompt. Everything in display and page memory is erased when you exit Reflection.

The keyboard shortcut is **Alt-X**.

What did you learn from this experience?

How did you feel about the experience?

What advice would you give to others?

What challenges did you face?

What did you enjoy most?

What did you find most difficult?

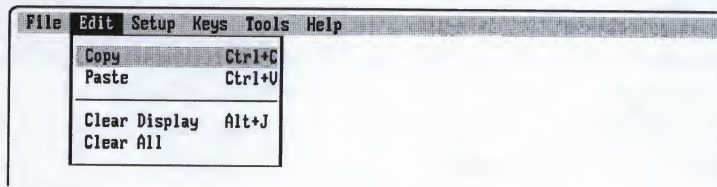
What did you learn about yourself?

What did you learn about others?

What did you learn about the world?

Edit Menu

The Edit menu contains editing commands that interact with Reflection's Clipboard text buffer, and commands that clear the contents of the screen display.



Edit Menu

Copy

Choose Copy to place selected text from the screen to an internal buffer called the Clipboard. Used in conjunction with the Paste command, Copy lets you copy text from the terminal screen and send it to a host application. This command is dimmed if you do not have any screen text selected.

See "Copy and Paste" on page 354.

The keyboard shortcut for Copy is **Ctrl-C**.

Paste

The Paste command causes the data copied to the Clipboard to be entered as if you had typed it from the keyboard. This command is dimmed if you have not copied any screen text to the Clipboard.

Pasted text is sent to the host when Reflection is in remote mode; this can be used to automate entry of frequently typed data. When Reflection is in local mode, the Paste command sends the text to the terminal screen. Since the selected text remains in the Clipboard until the contents of the Clipboard are cleared or overwritten, it can be pasted more than once.

See “Copy and Paste” on page 354.

The keyboard shortcut for Paste is **Ctrl-V**.

Clear Display

Choose Clear Display to erase all display memory from the cursor to the bottom of the screen.

The keyboard shortcut for Clear Display is **Alt-J**.

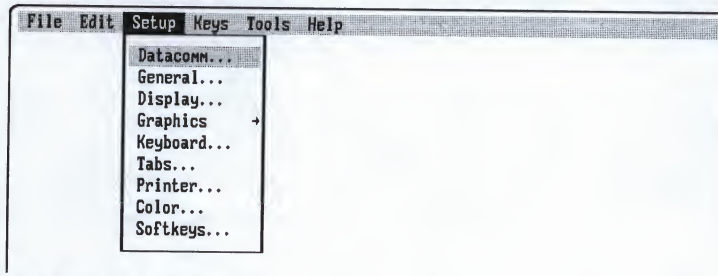
Clear All

Choose Clear All to erase all of display and page memory. This also resets the margins and clears the host status line.

This command is equivalent to entering the `MCLEAR` command on the Reflection command line.

Setup Menu

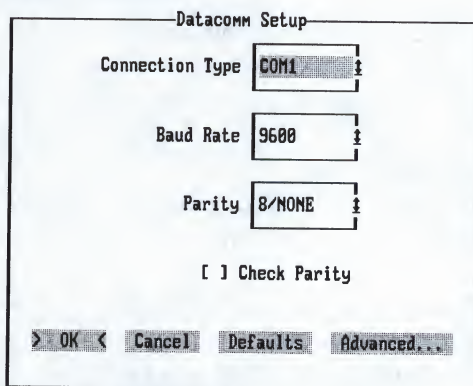
The Setup menu lists commands to configure parameters such as data communication, terminal type, printer support, and display enhancements.



Setup Menu (Reflection 4)

Datacomm

Choose Datacomm from the Setup menu to open the Datacomm Setup dialog box. The fields in this dialog box contain the basic settings needed to communicate with a host computer.



Datacomm Setup Dialog Box

Connection Type

This list box specifies which serial port or network protocol is used for communication with a host computer.

See "Network Connections," which begins on page 97, for a discussion of network options. For information on serial port and IRQ options, see page 82.

Values: COM1 (default)

COM2

COM3-IR4

Selects IRQ4 for COM3

COM4-IR3

Selects IRQ3 for COM4

CON-MGR

Walker Richer & Quinn's Connection Manager; for Reflection Network Series version 2.0 and above, the LAT Connection, Novell's NLAT and Extended NASI, and users of Digital's PATHWORKS

LAT

Most LAT protocol users should use CON-MGR; see page 104

TEL-MGR

Most Telnet protocol users should use CON-MGR; see page 137

ADV.NET

HP's AdvanceNet (OfficeShare or Network Services)

HP-TELNT

HP-TELNET—OfficeShare

IBM-ACS

IBM's LAN Asynchronous Connection Server

INT-14

Generalized environment using Interrupt 14

U.B.

Ungermann-Bass's Network

CTERM

DEC's Command Terminal Access Interface

NASI

Novell, Inc.

NET-VMS

Novell's NetWare for VMS

EICON

Eicon Technology Corporation's X.25 Server

BRIDGE

Bridge-3COM's Network

AT&T

AT&T Starlan

RAF

Datability's Remote Access Facility

MOBIUS

Fel Computing, Inc.

COM3-IR2

Selects IRQ2 for COM3; see page 83

COM3-IR5

Selects IRQ5 for COM3

COM3-IR10

Selects IRQ10 for COM3

COM4-IR2	Selects IRQ2 for COM4
COM4-IR5	Selects IRQ5 for COM4
COM4-IR11	Selects IRQ11 for COM4
COM5-COM8	(PS/2s only)
MNP-COM1-	Drivers for Microcom's Networking Protocol
MNP-COM8	external drivers; see page 89

Reflection command language equivalent:

SET DATACOMM-PORT <value>

Note: If you select a connection type (such as COM1 or COM2) that is already being used by your mouse driver, you will get a warning message and the option to accept or change the connection type. If you accept the selection, your datacomm choice and possibly your mouse will not work. ▲

Baud Rate

This list box specifies the speed at which Reflection transmits and receives data through the serial port.

Values:	110	1200	9600	57600
	150	1800	14400	115200
	300	2400	19200	
	600	4800	38400	

Default: 9600

Reflection command language equivalent:

SET BAUD <value>

Parity

This list box selects the character format used for communications. Reflection can transmit 7 or 8 data-bits for each character. The transmitter can optionally add a parity bit to the data-bits to provide error-checking. If the Check Parity check box (see page 224) is selected, the receiver tests each character for parity and sets an error indicator if the test fails. Reflection's data-bits and parity must match that of the communications link being used. To use the multinational character set or 8-bit controls, 8 data-bits must be selected. If your communications link generates parity but Reflection is configured to *NONE*, multinational characters appear on your screen. In this case configure to use parity.

Note: In VT52 and VT102 emulations only 7 data-bits are interpreted when parity is selected. ▲

Values: 8/NONE (default)
7/SPACE (or zeroes parity)
7/MARK (or ones parity)
7/EVEN
7/ODD
7/NONE
8/EVEN
8/ODD

Reflection command language equivalent:
SET DATA-BITS-PARITY <value>

Check Parity

This list box determines whether parity on received characters is checked. When this check box is selected, Reflection verifies parity on all received characters. When an error is found, the character in error is replaced by an ASCII DEL character. If this check box is cleared, no parity checking occurs. Parity is always generated for transmitted characters based on the value of Parity.

Values: *Cleared* (default)
Selected

Reflection command language equivalent:
SET CHECK-PARITY {YES | NO}

Advanced Datacomm Setup

Choose Advanced from the Datacomm Setup dialog box to open the Advanced Datacomm Setup dialog box. This dialog box contains additional datacomm settings that you may need to configure Reflection to communicate with your host computer.

Advanced Datacomm Setup

Character Transmit Delay	0	Transmit Pacing	XOM/XOFF
Line Transmit Delay	0	Receive Pacing	XOM/XOFF
Session # (LAN)	1	Stop Bits	(*) 1 () 2
Telnet Term ID	VT240	☐ CTS Required	☐ DSR Required
OK Cancel Defaults			

Advanced Datacomm Setup dialog Box

Character Transmit Delay

This text box specifies the number of milliseconds of wait time that Reflection should insert after each character when transmitting blocks of characters to the host system. When transmitting blocks of characters at high speeds, it may be necessary to slow the transmission speed to allow the host computer to keep pace.

Values: 0–255

Default: 0

Reflection command language equivalent:

SET CHARACTER-DELAY <value>

Line Transmit Delay

This text box specifies the amount of time (in tenths of seconds) that Reflection should wait after transmitting a carriage return character (the line delimiter) before it begins transmitting the next line.

When you are using the WRQ file transfer protocol, use a line delay instead of a character delay if you need to slow down transmission.

Values: 0–255

Default: 0

Reflection command language equivalent:

SET LINE-DELAY <value>

Session # (LAN)

If you are using a LAN that supports multiple sessions (for example, Ungermann-Bass), Reflection allows you to identify which session you would like as the current one. Enter the session number (1–255) and choose OK to select a session. If you are using a serial port (COM1–COM8), then the value of this item is ignored. See “Network Connections,” which begins on page 97, for a description of the supported networks.

Values: 1–255

Default: 1

Reflection command language equivalent:

```
SET SESSION# <value>
```

Telnet Term ID

This field is relevant only for Telnet connections. When connecting to some hosts with the Telnet protocol, Reflection may be queried for its terminal type before the connection is opened. Use this text box to enter a string of up to 15 characters that identifies the type of terminal you are using.

Values: <terminal type>

VT240 (R4 default)

VT220 (R2 default)

Reflection command language equivalent:

```
SET TELNET-TERMINAL-ID <string>
```

Receive Pacing

The host computer can sometimes transmit data to Reflection faster than Reflection can process it. If this continues for too long, Reflection's receive buffer overflows and data is lost. If the host computer recognizes the XON/XOFF handshake, you can prevent this overflow by keeping this list box set to XON/XOFF.

XON/XOFF receive pacing works as follows. When Reflection's receive buffer has room for fewer than 80 more characters, it sends an XOFF (ASCII DC3) character as a signal to stop transmitting. When Reflection has processed most of the backlog of characters in its receive buffer, it sends an XON (ASCII DC1) character to resume transmission from the host.

To set up Reflection so that XON and XOFF are sent via keystrokes, set this list box to *NONE*. This is the way that a VT terminal behaves when you choose *No XOFF* on the VT terminal's Communications Setup screen—**Ctrl-S** sends an XOFF, **Ctrl-Q** sends an XON, and (in the case of a serial connection) hold screen is disabled. You can also use the command `SET TRANSMIT-XON-XOFF` to do this.

Using XON/XOFF pacing with modems can cause problems with some hosts and many file transfer protocols. There is an alternative method that uses the RTS and CTS pins to control data flow. If you are using a high-speed modem that supports RTS/CTS flow control, set this field to *HARDWARE*. See page 89 for more information.

Values: XON/XOFF (default)
HARDWARE
NONE

Reflection command language equivalent:
`SET RECEIVE-PACING <value>`

Transmit Pacing

It is possible for Reflection to transmit data to the host computer faster than the host can process it. Should this continue for too long, the host's receive buffer overflows and data is lost. With this field, you can tell Reflection to stop transmitting whenever it receives an XOFF (DC3) character from the host system, and to resume transmitting only after receiving an XON (DC1) character.

If you are using a high-speed modem that supports RTS/CTS flow control, set this field to *HARDWARE*. See page 89 for more information.

If the Mode box in the General Setup dialog box is set to either *SCO ANSI* or *BBS ANSI*, the default value of this field is *NONE*.

Values: XON/XOFF (default)
HARDWARE
NONE

Reflection command language equivalent:
`SET TRANSMIT-PACING <value>`

Stop Bits

Stop bits are bits transmitted after each data character to signal the end of the character. Select 1 stop bit for all baud rates other than 110 baud, and 2 stop bits for 110 baud, unless you are positive that your host system or serial device requires otherwise.

Values: 1 (default)
2

Reflection command language equivalent:
SET STOPBITS <value>

CTS Required

When this check box is selected, Reflection does not transmit unless the RS-232 Clear To Send signal (pin 5) is active (true). When this check box is cleared, Reflection ignores the signal.

If you are using a high-speed modem that supports RTS/CTS flow control, set Receive Pacing and Transmit Pacing to *HARDWARE* and clear this check box.

Values: *Cleared* (default)
Selected

Reflection command language equivalent:
SET CTS-REQUIRED {YES | NO}

DSR Required

When this check box is selected, Reflection does not transmit unless the RS-232 Data Set Ready signal (pin 6) is active (true). When this check box is cleared, Reflection ignores the signal.

If you are using a high-speed modem that supports RTS/CTS flow control, set Receive Pacing and Transmit Pacing to *HARDWARE* and clear this check box.

Values: *Cleared* (default)
Selected

Reflection command language equivalent:
SET DSR-REQUIRED {YES | NO}

General

Choose General from the Setup menu to open the General Setup dialog box. Use this dialog box to configure options such as the user-preferred supplemental character set, the operating level of Reflection, and the type of terminal you want Reflection to emulate.

The screenshot shows the 'General Setup' dialog box with the following fields and options:

- Terminal ID:** VT340
- Mode:** VT400-7
- Language:** ENGLISH
- UPS Set:** DEC
- MRC Set:** NONE
- Cursor Keys:**
 - ☒ Normal
 - ☐ Application
- Keypad:**
 - ☒ Normal
 - ☐ Application
- Macro Storage:** 10
- Options:**
 - ☒ Online
 - ☐ User Features Locked
 - ☐ User-Defined Keys Locked
 - ☐ New Line
 - ☐ Use MRC (7-Bit) Chars

Buttons at the bottom: OK, Cancel, Defaults.

General Setup Dialog Box

Terminal ID

This list box determines how Reflection responds to a primary device attribute request from the host (usually at login). The setting of this field is independent of the setting for Mode. Terminal ID is also known as a device attribute response. See page 606 for a table of DA responses.

Values: VT340 (Reflection 4 default)	VT102
VT240 (Reflection 4 only)	VT100
VT125 (Reflection 4 only)	VT100av
VT320 (Reflection 2 default)	VT100p
VT420	WRQ
VT220	

Reflection command language equivalent:

SET DA-RESPONSE <value>

Mode

Specifies which VT or ANSI terminal should be emulated. These choices affect the codes generated by the numeric keypad and the function keys and the interpretation of control functions.

Values: VT52 VT400-8
 VT102 SCO ANSI
 VT400-7 (default) BBS ANSI

Reflection command language equivalent:

SET TERMINAL-TYPE <value>

VT Terminals

When Mode is set to VT52 or VT102, all received data is forced to 7-bits. This precludes use of the multinational character set and 8-bit control characters. When Mode is VT400-7 (the default for both Reflection 2 and Reflection 4), 7-bit control sequences are generated. However, 8-bit control sequences are processed correctly when received. When Mode is VT400-8, 8-bit control sequences are processed correctly when received, and are generated.

ANSI Terminals

You can make Reflection conform to the specifications for SCO ANSI (which is also known as "ANSI console" or "ANSI 80×25") or use the ANSI settings that are common with electronic bulletin boards. This is done by setting Mode to either SCO ANSI or BBS ANSI.

If you toggle between an ANSI and a VT terminal type, then the setup fields in the following table are reset to their defaults. Also, any customized keyboard mapping you have does not remain in effect when you change your terminal type between VT and ANSI.

Setup Field

Actual Display Memory
 Answerback Message
 Auto Repeat
 Autowrap
 Backspace Key Sends

Dialog Box

Advanced Display Setup
 Answerback Setup
 Keyboard Setup
 Display Setup
 Keyboard Setup

Setup Field

Break
 Caps Lock
 Character Transmit Delay
 Compose key
 Conceal Answerback
 Control Characters
 Cursor
 Cursor Keys
 Display Rows
 EGA Character Sets
 Horizontal Coupling
 Initial Labels
 Keypad
 Line Transmit Delay
 Local Echo
 Macro Storage (K)
 Margin Bell
 Mode
 New Line
 NRC Set
 Online
 Page Coupling
 Page Memory Arrangement
 Requested Display Memory
 Reverse Background
 Columns
 Scrolling Speed
 Status Line
 Terminal ID
 UPS Set
 User Features Locked
 User-Defined Keys Locked
 Vertical Coupling
 Warning Bell
 XOFF on Mode Switch

Dialog Box

Keyboard Setup
 Keyboard Setup
 Advanced Datacom Setup
 Keyboard Setup
 Answerback Setup
 Display Setup
 Display Setup
 General Setup
 Display Setup
 Video Options Setup
 Advanced Display Setup
 Display Setup
 General Setup
 Advanced Datacom Setup
 Keyboard Setup
 General Setup
 Keyboard Setup
 General Setup
 General Setup
 General Setup
 General Setup
 General Setup
 Advanced Display Setup
 Advanced Display Setup
 Advanced Display Setup
 Display Setup
 Display Setup
 Video Options Setup
 Display Setup
 General Setup
 General Setup
 General Setup
 General Setup
 Advanced Display Setup
 Keyboard Setup
 Video Options Setup

The setup fields and SET parameter in the next table have different default values depending on whether Mode is set to either SCO ANSI or BBS ANSI, or to a VT choice. See page 485 for more details on what happens when you change terminal types.

Setup Field or RCL	ANSI Default	VT Default
Backspace Key Sends	<i>Backspace</i>	<i>Delete</i>
Display Rows	25	24
EGA Character Sets	MCS	ALL
Autowrap	<i>Selected</i>	<i>Cleared</i>
Transmit Pacing	NONE	XON/XOFF
UPS Set	CP437	DEC
TRANSMIT-XON-XOFF	YES	NO

Values: VT400-7 (default)
 VT400-8
 SCO ANSI
 BBS ANSI
 VT52
 VT102

Reflection command language equivalent:
 SET TERMINAL-TYPE <value>

Language

This list box specifies the language that the menus, dialog boxes, prompts, online help, and error messages use.

Values: ENGLISH (default)
 FRANCAIS
 DEUTSCH

Reflection command language equivalent:
 SET LANGUAGE <value>

UPS Set

The user-preferred supplemental set (UPSS) is a character set that supplements the ASCII set. By default, 8-bit characters are displayed using the current UPSS. The combination of the ASCII and DEC Supplemental Graphics character sets is called the multinational character set (choose *DEC*). The combination of the ASCII and Latin-1 sets is called the ISO Latin-1 character set. Selecting *LATIN-1* makes additional compose characters available; they are listed on page 650. Character sets with the "CP" prefix denote IBM PC code pages.

If the Mode field is set to either SCO ANSI or BBS ANSI, the default value for this field is CP437.

Values: <i>DEC</i> (default)	CP850	CP863
<i>LATIN-1</i>	CP860	CP865
CP437		

Reflection command language equivalent:

SET UPSS <value>

Control function equivalent:

DECAUPSS

See page 605

NRC Set

Some host systems use national replacement characters to encode accented characters and symbols for a specific language that are not available in the ASCII 7-bit character set. If necessary, set this field to match the NRC set used by your host. The Use NRC (7-bit) Chars check box must also be checked to use national replacement characters.

See page 652 for a chart of NRC translations for 7-bit operations.

Values: <i>NONE</i> (U.S.—default)	<i>ITALIAN</i>
<i>BRITISH</i>	<i>NORWEGIAN/DANISH</i>
<i>DUTCH</i>	<i>SPANISH</i>
<i>FINNISH</i>	<i>SWEDISH</i>
<i>FRENCH</i>	<i>SWISS</i>
<i>CANADIAN</i>	<i>PORTUGUESE</i>
<i>GERMAN</i>	

Reflection command language equivalent:

SET NATIONAL-REPLACEMENT-SET <value>

Cursor Keys

These option buttons select the codes to be generated from the cursor keys. Either the normal cursor control escape sequences or special application escape sequences are generated. This option is usually controlled by an application program running on the host computer. Changing it locally may cause problems.

Values: *Normal* (default)
Applicationn

Control function equivalent:
 DECCKM See page 574

Keypad

These option buttons select the codes to be generated from the keys on the numeric keypad. Either normal numeric values or special application escape sequences are generated. This option is usually controlled by an application program running on the host computer. Changing it locally may cause problems.

Values: *Normal* (default)
Application

Control function equivalents:

DECNKM	See page 574
DECKPAM	See page 574; for VT52, see page 630
DECKPNM	See page 574; for VT52, see page 630

Macro Storage

One of the features of the VT420 terminal allows you (or an application) to create and invoke macros. This text box specifies how much memory is allotted for macro storage. In Reflection 4 this same field allocates the memory for ReGIS macrographs.

Values: 0-63

Default: 10 (Reflection 4 default)
 6 (Reflection 2 default)

Reflection command language equivalent:
 SET MACRO-STORAGE-K <value>

Online

Reflection is always in either remote or local mode. Keeping this check box selected means that Reflection can communicate with the host as a terminal—this is known as remote mode. Reflection transmits each character typed at the keyboard to the host. As Reflection receives characters from the host, it displays them on the screen. When Reflection is in remote mode, but is not connected to a host computer, anything typed at the keyboard does not appear on the screen.

When you clear this check box, Reflection can no longer communicate with a host—this is known as local mode. In local mode, Reflection does not attempt to communicate with the host computer. Characters entered from the keyboard show on the screen, but they are not transmitted to the host. If the PC is actively connected to a host computer while it's in local mode, Reflection discards any data it receives from the host.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET REMOTE-MODE {YES | NO}

User Features Locked

This check box locks the following items so they cannot be changed by the host computer: Reverse Background, Scrolling Speed, and Auto Repeat.

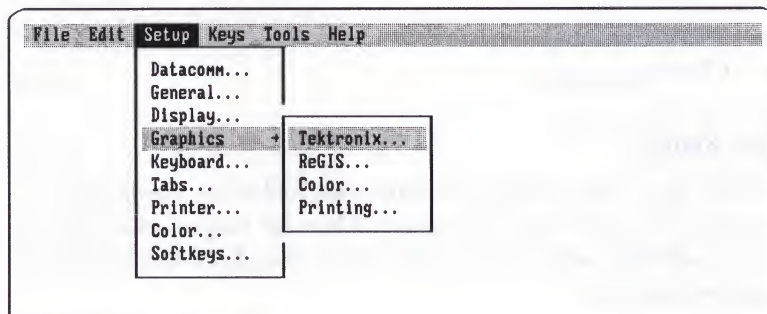
Values: *Cleared* (default)
Selected

Reflection command language equivalent:

SET USER-FEATURES-LOCKED {YES | NO}

Graphics (R4 Only)

Choose Graphics from the Setup menu to open the cascading Graphics Setup menu. The commands on the Graphics Setup menu open dialog boxes used to configure Reflection for Tektronix and ReGIS graphics terminal emulation, for graphics color display, and graphics printing.



Graphics Setup Cascading Menu

Digital's graphics terminals—the VT240, VT241, VT330, and VT340—support three types of graphics: Tektronix, ReGIS, and sixels.

Tektronix 4010/4014

Reflection 4 includes emulation of the Tektronix 4010 and 4014 terminals. See page 253 for setup information, and see the *Advanced Topics* manual for information on using this emulation.

ReGIS

Reflection 4 supports Digital's *Remote Graphics Instruction Set*, a symbol system that describes the parts of an image using standard geometric forms: lines, dots, arcs, circles, and curves. You can also use ReGIS to create fill patterns and text. See page 256 for setup information, and see the *Advanced Topics* manual for complete information on ReGIS commands.

Sixels

With sixels in Reflection 4, graphic images are received from the host, or sent to the host or DEC printer, 6 pixels at a time (a sixel is 1 pixel wide and 6 pixels high). See page 264 for graphics printer setup information.

Tektronix

Choose Tektronix from the Graphics Setup menu to open the Tektronix Setup dialog box. Use this dialog box to configure Reflection to emulate the Tektronix 4010 and 4014 graphics terminals.

Tektronix Setup

GIN Terminator ☐ None (*) ☒ CR ☐ CR-EOT DEL ☒ Lo Y (*) ☐ Ignored ☐ Insert Special Character Auto Enter Character	LF Effect ☒ LF (*) ☐ LF-CR CR Effect ☒ CR (*) ☐ CR-LF ☐ Virtual Screen ☐ Page Full Break ☐ Page Full Busy ☐ Destructive Overwrite
--	---

Tektronix Setup Dialog Box

It shouldn't be necessary to change the default values for this dialog box. You may want to select the Virtual Screen check box to be able to view the entire Tektronix image, and you may want to set CR Effect to *CR-LF* so that both a carriage return and linefeed are performed in local mode when you press Enter. When operating in remote mode use CR instead.

GIN Terminator

The GIN terminator option buttons determine which character acts as a terminator for cursor address information. You can select either CR (carriage return), CR EOT (carriage return and Ctrl-D or end of transmission), or NONE.

The default value for GIN Terminator is CR.

Values: CR (default)
 CR-EOT
 None

DEL

When this field is set to *Lo Y*, Reflection interprets DEL characters as valid ASCII characters. Reflection ignores DEL characters if DEL is set to *Ignored*.

Values: *Lo Y* (default)
Ignored

LF Effect

Selecting *LF-CR* appends a carriage return character to each linefeed character. This is useful in local mode.

Values: *LF* (default)
LF-CR

CR Effect

Selecting *CR-LF* appends a linefeed character to each carriage return character (Enter ↵). This is useful in local mode.

Values: *CR* (default)
CR-LF

Insert Special Character

Selecting this check box lets you include an ASCII control character in the Auto Enter Character text box. This field is dimmed initially and can only be reached by first moving the cursor to Auto Enter Character. Once you select this check box, you cannot use Tab or Enter ↵ to leave the Auto Enter Character text box—instead use the ↓ or ↑ key.

Values: *Cleared* (default)
Selected

Auto Enter Character

If the VT terminal emulation detects the auto enter character, it automatically switches the PC's video card to graphics mode and puts Reflection into Tektronix emulation.

Because the 4014 terminal uses the group separator character (^J) to enter graphics mode, you may want to use it in this text box. To do so, select the Insert Special Character check box, and press **Ctrl-J** in this field. You will see the group separator mnemonic (^J) in place of *None*.

Values: *None* (default)
<an ASCII control character>

Virtual Screen

When this check box is cleared, anything sent to the Tektronix screen is scaled to fit on the PC screen. Selecting this check box allocates a buffer as a *virtual* Tektronix screen of 1024×780 pixels, with each bit in the buffer representing a pixel on the Tektronix screen. This way, the relatively low resolution PC screen can be used as a window to view any portion of the much higher resolution Tektronix screen. This does not disable the scaled screen; you can toggle back and forth between a scaled and unscaled image with the **Alt-Z** keystroke. Selecting Virtual Screen requires an additional 100K of RAM.

Understanding some graphics terminology helps in configuring this field:

- Scaled The Tektronix 1024×780 screen is scaled to fit on the PC screen.
- Unscaled The PC screen shows only a portion of the Tektronix 1024×780 screen.
- Window A window is a portion of the unscaled Tektronix 1024×780 screen that is shown on the PC screen.

See the Reflection *Advanced Topics* manual for information on Tektronix keystrokes.

Values: *Cleared* (default)
Selected

Page Full Break

When the host sends a large amount of text to the screen, you may want to send a break signal once a full page of text is received. This check box determines whether a break signal is sent to the host on a full page condition.

Values: *Cleared* (default)
Selected

Page Full Busy

Selecting this check box locks the terminal after a full page of text is received. The PAGE function (**Alt**-**P**) clears the screen and unlocks the terminal. This function is useful if the host computer is sending a large amount of text to the screen and you want to have enough time to read one page of information before it is overwritten with the next page.

Values: *Cleared* (default)
Selected

Destructive Overwrite

By default, a character typed over another one in Tektronix emulation does not erase the first one: the second one is superimposed on the first. Selecting this check box specifies that a character cell is blanked out before a character is drawn.

Values: *Cleared* (default)
Selected

ReGIS

Choosing ReGIS from the Graphics Setup menu opens the ReGIS Setup dialog box. Use this dialog box to emulate the ReGIS (Remote Graphics Instruction Set) features of the VT340 and VT241 color graphics terminals, and the VT330 and VT240 monochrome graphics terminals.

ReGIS Setup

Terminal Type () VT240 () VT330 () VT241 (*) VT340	# Downloadable Char Sets () 0 () 1 () 2 (*) 3
[x] Enable Graphics Output Cursor [x] Enable Macrograph Reports [x] Enable Sixel Scrolling [] Auto Enter Graphics Mode [] Auto Exit Graphics Mode	# Bit Planes Saved (*) 0 () 1 () 2 () 3 () 4
> OK < Cancel Defaults	

ReGIS Setup Dialog Box

Terminal Type

The graphics terminal type that you choose determines which terminal is emulated and how many shades or colors are available in ReGIS:

- ▲ VT340 offers 16-color capability
- ▲ VT241 offers 4-color capability
- ▲ VT330 and VT240 offer 4 monochrome shades

The value that you set in this field is independent of the settings for Terminal ID and Mode in the General Setup dialog box.

Values: VT340 (default)

VT240

VT241

VT330

Reflection command language equivalent:

SET GRAPHICS-TERM-TYPE <value>

Enable Graphics Output Cursor

Selecting this check box displays the graphics output cursor. The graphics output cursor appears when the terminal is waiting for ReGIS input from the host and indicates the current drawing position. The default output cursor is diamond shaped.

Values: *Selected* (default)

Cleared

Enable Macrograph Reports

A macrograph is a means of defining and storing the commands used to draw graphics. Each macrograph is identified by a letter of the alphabet. Selecting this check box enables ReGIS to report the contents of a given macrograph. The contents are not reported when this check box is cleared. The macrograph command is explained in the "Macrograph Command" chapter of the *Reflection Advanced Topics* manual.

Values: *Selected* (default)

Cleared

Enable Sixel Scrolling

When sixels are displayed on your screen, the display begins at the left margin of the row the cursor is on. A next line character (-) is sent immediately after the sixel dump. When this check box is selected (the default), the text cursor is in the same position as the sixel cursor after the sixel image has finished. This means that the top line of the sixel image usually scrolls off the screen.

When this check box is cleared, the display begins at the top left corner of the screen. The image does not scroll up and the text cursor remains in the same position as when graphics mode was entered.

Values: *Selected* (default)

Cleared

Control function equivalent:

DECSDM See page 589

Auto Enter Graphics Mode

This check box determines whether Reflection enters graphics mode in the following situations:

- ▲ When Reflection receives a 132-column mode control function.
- ▲ When a double-width line is begun. In graphics mode, Reflection displays double-width and double-height characters accurately; in text mode, it simulates them by leaving a blank space between the characters.

Note: If you've configured a 132-column adapter, a 132-column mode control function does not cause Reflection to go into graphics mode, even when this check box is selected. ▲

When this check box is selected, the escape sequences $^{Esc}\#6$, $^{Esc}\#3$, $^{Esc}\#4$, and $^{C_{SI}}\#3h$ force Reflection into graphics mode. Text mode is slightly faster than graphics mode.

In Reflection 2 bit-mapped (R2 /B132), this mode can only be set via the Reflection command language equivalent—there is no setup field.

Values: *Cleared* (default)
Selected

Reflection command language equivalent:

SET AUTO-ENTER-GRAPHICS {YES | NO}

Auto Exit Graphics Mode

This check box determines whether Reflection leaves graphics mode and enters text mode when Reflection is put into 80-column mode or when the screen is cleared. When this check box is selected, the escape sequences $^{C_{SI?31}}$, $^{C_{SI2J}}$, or $^{E_{SCH}}$ (when followed by $^{C_{SIJ}}$) force Reflection into text mode.

When you exit ReGIS, Reflection 4 remains in graphics mode so that ReGIS images are preserved. Many applications enter and exit ReGIS frequently and rely on having the image remain on the screen. Use (Alt)-V to manually toggle between text and graphics modes.

Note: If Reflection is in graphics mode and 132-column mode when it receives a clear-screen escape sequence, it does not exit graphics mode, even if Auto Exit Graphics Mode is selected. ▲

In Reflection 2 bit-mapped (R2 /B132), this mode can only be set via the Reflection command language equivalent—there is no setup field.

Values: *Cleared* (default)
Selected

Reflection command language equivalent:

SET AUTO-EXIT-GRAPHICS {YES | NO}

Downloadable Char Sets

This group box controls the number of character sets that can be downloaded. You can reduce Reflection's memory requirements by restricting the number of downloaded character sets. Each character set requires 1248 bytes.

Values: 0–3
Default: 3

Bit Planes Saved

This group box determines how many bit planes are saved when you toggle between graphics and text modes, or between foreground and background.

If 0 bit planes are used, Reflection presents a screen with 16-color capability, but does not *save* the screen when you enter text mode (for instance if you press **Alt-V**) or bring up any text screen—help, terminal setup, and so on), or when you toggle Reflection into the background. (Background mode is discussed on page 319.) Tektronix images are also not saved. If 1 bit plane is used, only two colors (usually black and white) are displayed in ReGIS mode, and a Tektronix image is saved.

To save the graphics image, use the following table to determine additional memory requirements:

Bit Plane Memory Requirements in 640x350 Mode

Number of planes	1	2	3	4
Number of colors	2	4	8	16
Additional memory	28K	53K	78K	103K

Reflection 4 calculates the amount of free memory that you have when the program is loaded. If you are configured to save all 4 bit planes and you do not have enough memory to do so, Reflection automatically changes the value of # Bit Planes Saved to the highest value for which you have sufficient memory.

Values: 0–4

Default: 0

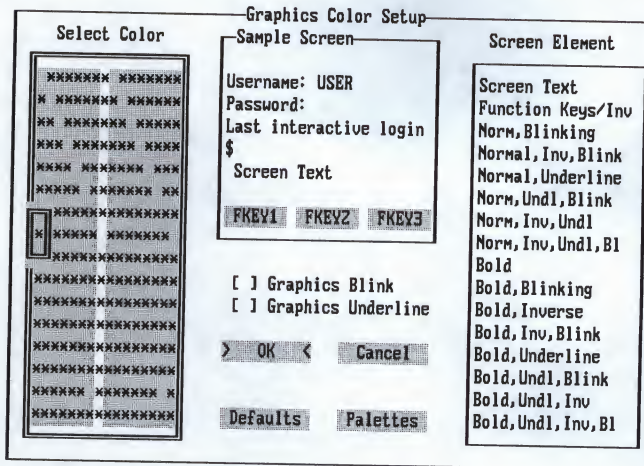
Reflection command language equivalent:

```
SET BIT-PLANES-MAVED <value>
```

Color (R4 Graphics)

Choose Color from the Graphics Setup cascading menu to open the Graphics Color Setup dialog box. Use this dialog box to configure Reflection's color settings when in graphics mode.

Press **[Alt]-[V]** to toggle between Reflection's text and graphics modes. In Reflection 4 you can have a different background (screen) color in text and graphics modes: this helps in telling them apart. By default, the background is blue in text mode and black in graphics mode.



Graphics Color Setup Dialog Box

Select Color

Use this field to select the foreground color (shown by an asterisk) and background color for the corresponding item highlighted in the Screen Element list box. As you use the mouse or cursor keys to move from one color selection to another, notice that the changes are shown on the sample screen.

Screen Element

Use this list box to select color attributes for three separate parts of the screen: *Screen* selects foreground and background colors. *Function Keys/Inv* selects foreground and background colors for the function key labels (if displayed). The remaining 14 items in the Screen Element box control how data sent from the host is displayed. They include any combination of blinking, inverse video, underline, and bold intensity. If Terminal Type in the ReGIS Setup dialog box is set to any value except VT340, the Graphics Color Setup dialog box appears in only four colors or shades.

Graphics Blink

Select this check box to enable the display of blinking characters in graphics mode.

Values: *Cleared* (default)
Selected

Graphics Underline

Select this check box to enable the display of underline characters in graphics mode.

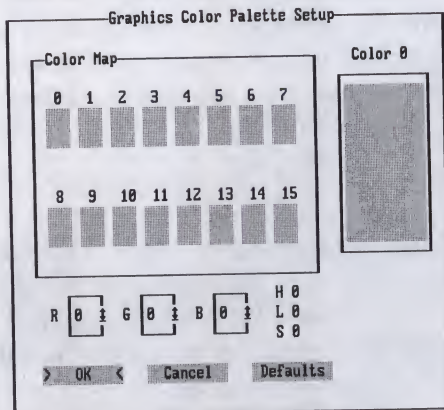
Values: *Cleared* (default)
Selected

Sample Screen

This read-only field shows how the choices made in the Screen Element and Select Color fields look on screen.

Palettes

Use this button to display the Graphics Color Palette Setup dialog box. This dialog box is equivalent to the VT340 terminal's color setup. The color map consists of 16 *color numbers* that each define a color.



Graphics Color Palette Setup Dialog Box

Use caution if you plan to change the color map. Many ReGIS applications set up a color map for you, and then restore the VT terminal *defaults* when you exit the application. You may have to restore your own color map values if they differ from the defaults. You can do this by displaying the command line (**Alt-F10**) and reloading your configuration file with the following command:

```
LOAD <filename>.CFG
```

Some host applications do not set up a color map for you: they assume that you are using the default terminal colors. If you change the defaults, the application may not look right. The control function for display enhancements (SGR) is discussed on page 546.

Default Color Map

In the ReGIS Setup dialog box you can determine which graphics terminal type Reflection should emulate. There is a default color map for each terminal type:

VT340 (default)	16 colors
VT241	4 colors
VT330	4 monochrome shades
VT240	4 monochrome shades

The Graphics Color Palette Setup dialog box always displays colors or shades 0–15. If Terminal Type in the ReGIS Setup dialog box is set to a value other than VT340, the default color map and the setup screen itself show only four unique colors or shades in the columns 0–3. These four colors are repeated to form the 16-shade color map: the columns 0–3, 4–7, 8–11, and 12–15 contain the same set.

Each terminal type not only has a default number of colors or shades, but also a default set of values for all of the character attributes (foreground, background, inverse video, underline, and bold).

- ▲ In the Graphics Color Palette Setup dialog box, choosing the Defaults button displays the default color map for the graphics terminal type you have chosen.
- ▲ In the Graphics Color Setup dialog box, choosing the Defaults button displays the default character attributes for your chosen terminal type.

Changing the Color Map

You can change the default color or shade for each number—no matter what the graphics terminal type is—by mixing the amounts of red, green, and blue (RGB) associated with it.

Hue, lightness, and saturation (HLS) values are also displayed in the Graphics Color Palette Setup dialog box. HLS values change when RGB values change, but they cannot be configured directly.

The minimum RGB or HLS value is 0; the maximum value is 99.

- ▲ An EGA card allows for 4 levels of red, green, and blue (0, 33, 66, and 99). This means that the total color palette available for *each* color number contains 64 choices.
- ▲ A VGA card allows for 16 levels of RGB (0, 7, 13, 20, 27, 33, and so on). The number of color possibilities for each color number is 4,096.

Printing (R4 Graphics)

Choose Printing from the Graphics Setup cascading menu to open the Graphics Printing Setup dialog box. Use this dialog box to control how graphics are printed.

Graphics Printing Setup

Print Mode
☒ Compress (<) Rotate (<) Expand

Color printing
☒ Mono (<) Color

Destination
☒ Printer (<) Host

Color Specification
☒ HLS (<) RGB

Graphics Level
☒ Level 1 (<) Level 2 (<) LA210

☒ Print Graphics
☐ Print Background

> OK < Cancel Defaults

Graphics Printing Setup Dialog Box

In sixel graphics the screen image is received from the host, or sent to the host or DEC printer, six pixels at a time (a sixel is one pixel wide and six pixels high). Reflection 4, like the VT340, lets you draw monochrome or color images with sixel data.

The format for sixel data is discussed in “Control Functions” on page 586. The Graphics Printing Setup dialog box only needs to be changed when you are generating sixels, not when you are receiving them. The VT340 implementation is supported even if you are set up for another terminal in the Mode field of the General Setup dialog box.

A SET parameter (SET GRAPHICS-PRINT-RESET) specifies whether a reset (^EScE) is sent to the printer at the start of a graphics print. If you set this parameter to NO, you may also want to verify the following settings in the Printer Setup dialog box to ensure complete manual control of the printer:

- ▲ Set Print Mode to *Normal*
- ▲ Select the Auto Form Feed check box

Print Mode

This list box controls how graphic images are sent to the host or printer. *Compress* prints an image pixel for pixel. *Rotate* rotates the image 90° (from a portrait orientation to a landscape orientation). *Expand* prints each pixel double wide and double high.

Values: *Compress* (default—valid for all printer types)
Rotate (valid for all printer types)
Expand (sixel printing only)

Reflection command language equivalent:

SET GRAPHICS-PRINT <value>

Control function equivalents:

DECGEPM See page 582

DECGRPM See page 582

Destination

This field controls whether a sixel image is sent to the printer or the host. Select *Host*, for instance, if you want to include a sixel image inside an ALL-IN-1 mail message.

Values: *Printer* (default)
Host

Control function equivalent:
MC See page 583

Graphics Level

Each sixel graphics level has a sixel aspect ratio and a horizontal grid size. Most DEC printers can operate at Level 2. This means that they can also operate at Level 1.

Level 1 Selects a sixel aspect ratio of 2:1 and a horizontal grid size of about 188×.025 mm (7.5×.001 inches).

Level 2 Selects a sixel aspect ratio of 1:1 and a variable grid size.

LA210 Selects a sixel aspect ratio of 1.02:1 and a horizontal grid size of about 338×.025 mm (13×.001 inches).

Some printers only understand a certain level of graphics. The LA50, for instance, is a Level 1 printer and cannot operate at Level 2. If you are using an LA210, you can select either LA210 or *Level 1*.

Values: *Level 1* (default)
Level 2
LA210

Color Printing

Selects monochrome or color printing.

Values: *Mono* (default)
Color

Control function equivalent:
DECGPCM See page 582

Color Specification

Selects the color coding method for the printer. It is relevant only if Color Printing is set to *Color*.

Values: *HLS* (default)
RGB

Control function equivalent:
DECGPCS See page 583

Print Graphics

When this check box is selected, **Alt**-**PrtSc** can do one of two things, depending on the setting of the Control Codes list box in the Printer Setup dialog box (described on page 278):

- ▲ If Control Codes is set to *DEC*, a sixel image is sent to the printer.
- ▲ If Control Codes is set to a value other than *DEC*, a graphics dump is sent to the printer.

When this check box is cleared, only a text version of the image on the screen is sent to the printer.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:
SET PRINT-GRAPHICS {YES | NO}

Print Background

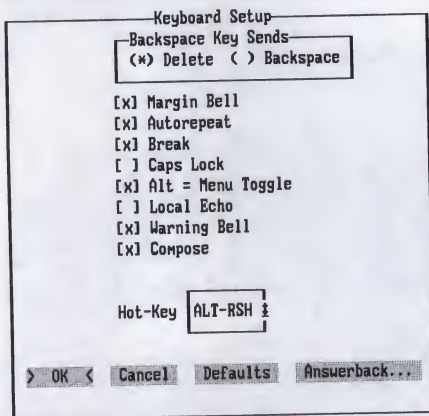
This check box lets you specify whether to print the background color when sending a graphics image to the printer. (Control Codes, described on page 278, should be set to *PAINTJET* or *DJET500C* in the Printer Setup dialog box.) When this check box is selected, all the colors on the screen are printed. When it is cleared, all but the background colors are printed; the background is left white.

Values: *No* (default)
Yes

Control function equivalent:
DECGPBM See page 583

Keyboard

Choose Keyboard from the Setup menu to open the Keyboard Setup dialog box. Use this dialog box to customize the behavior of your keyboard.



Keyboard Setup Dialog Box

Backspace Key Sends

On the VT300 series keyboard the backarrow key ($\langle x \rangle$) is configurable: it can be set up to send either a delete (ASCII decimal 127) or a backspace (ASCII decimal 8).

In Reflection you can configure $\langle \text{Backspace} \rangle$ to send either delete or backspace. $\langle \text{Ctrl} \rangle$ - $\langle \text{Backspace} \rangle$ sends the opposite of what Backspace Key Sends is configured to. If this field is configured to send delete, for example, then $\langle \text{Ctrl} \rangle$ - $\langle \text{Backspace} \rangle$ sends a backspace.

If the Mode field in the General Setup dialog box is set to either SCO ANSI or BBS ANSI, the default value of this field is *Backspace*.

Values: *Delete* (default)
Backspace

Control function equivalent:
DECBKM See page 575

Margin Bell

When this check box is selected, Reflection emits a beep when a character is typed from the keyboard into the column that is eight columns short of the right margin.

If this check box is selected, but the SET parameter BELL-ENABLED (which affects all of the bells on your PC) is set to NO, the bell will not sound.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

SET MARGIN-BELL {YES | NO}

Autorepeat

Selecting this check box makes the keyboard automatically repeat any key that is held down. When this check box is cleared, keys do not automatically repeat. When User Features Locked in the General Setup dialog box is selected, the value of this field cannot be changed by the host.

Note that Reflection does not modify the repeat speed and initial delay in use by the keyboard processor.

Values: *Selected* (default)
Cleared

Control function equivalent:

DECARM See page 573

Break

This check box enables and disables the action of **Break**, which sends a break command to the host computer.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:

BREAK-ENABLED {YES | NO}

Caps Lock

When this check box is selected, Reflection limits the characters that can be produced from the keyboard to Teletype-compatible codes:

- ▲ No lowercase alphabetic characters are generated. All alphabetic keys are automatically shifted.
- ▲ The left and right braces ({ and }) and vertical bar (!) are disabled.
- ▲ The ~ and ' symbols are disabled.

Values: *Cleared* (default)
Selected

Alt = Menu Toggle

When this check box is selected, pressing the **Alt** key toggles the menu bar on and off. When this check box is cleared, **Alt** will not activate the menu bar, and you must use **Alt** in combination with a shortcut key, or the mouse, to open a specific menu.

Values: *Selected* (default)
Cleared

Reflection command language equivalent:
 SET ALT-MENU-TOGGLE {YES | NO}

Local Echo

When this check box is selected, each character typed at the keyboard is immediately displayed on the screen.

When remote mode is enabled (by selecting Online in the General Setup dialog box), each character typed at the keyboard is transmitted to the host computer. Most host systems (for example, the VAX running under VMS) immediately send the same character back to the terminal (that is, they *echo* the character). The character is not displayed on the screen until it is received back from the host. This is sometimes called *full duplex*.

When local echo and remote mode are both selected, each character is sent two places, directly to display memory (the screen) and to the host computer.

Therefore, if you are communicating with a host computer that echoes and Local Echo is selected, each character you type appears twice on the screen. For this reason, select this check box only when communicating with host systems that do not echo each typed character (for example, some public networks).

When Reflection is in local mode, a local echo is enabled.

Values: *Cleared* (default) Full duplex
 Selected Half duplex

Reflection command language equivalent:
 SET LOCAL-ECHO {YES | NO}

Control function equivalent:
 SRM See page 555

Warning Bell

Selecting this check box sounds a warning bell for operator errors, or when a file transfer completes. Clearing this check box prevents a warning bell from sounding.

Values: *Selected* (default)
 Cleared

The following Reflection command affects all the bells on your PC; this parameter must be set to YES in order for the bell to sound:

 SET BELL-ENABLED {YES | NO}

Compose

The compose key (**Alt**-**F8**) in Reflection) can be enabled or disabled, depending on whether this check box is selected or cleared.

Values: *Selected* (default)
 Cleared

Hot-Key

Use this list box to select which key combination places Reflection in the background, or disable the hot-key feature. The hot-key allows you to put Reflection in the background and use DOS or another PC application, and to return Reflection to the foreground. See "Reflection as a Pop-Up Terminal" on page 319 for more information on this feature.

The hot-key is initially set as **(Alt)-(right)(Shift)**. When these keys are pressed, Reflection is immediately placed in the background. Pressing these keys again toggles Reflection back to the foreground.

A value of *NONE* disables the hot-key.

Values: ALT-RSH (default)

CTL-LSH

ALT-LSH

NONE

LSH-RSH

CTL-RSH

ALT-CTL

Reflection command language equivalent:

SET HOT-KEY <value>

Answerback

Choose the Answerback button to open the Answerback Setup dialog box. Use this dialog box to send an answerback message to the host either when the answerback key (**(Alt)-F7**) is pressed, or upon the receipt of an ENQ character (^{EN}Q) from the host.

Answerback Setup Dialog Box

Answerback Message

Enter a message up to 30 characters long in this text box. This message is transmitted to the host either when the answerback key (**(Alt)-F7**) is pressed, or upon the receipt of an ENQ character (^{EN}Q) from the host.

Values: <Any message of up to 30 characters>

Default: Null

Reflection command language equivalent:

SET ANSWERBACK <string>

Insert Special Characters

Selecting this check box allows you to include control functions and ASCII control codes in the Answerback Message box. Once you select this check box, you cannot use **Tab** or **Enter** to leave the Answerback Message field—instead use **↓** or **↑** to go to the next or previous field, or use the shortcut keys. When you are done inserting special characters in the answerback message, clear this check box.

Values: *Cleared* (default)

Selected

Clear

Choose this button to clear the currently displayed answerback message.

Conceal Answerback

When this check box is selected, the current answerback message is concealed. Clearing this check box does not cause the answerback message to be redisplayed.

Values: *Cleared* (default)

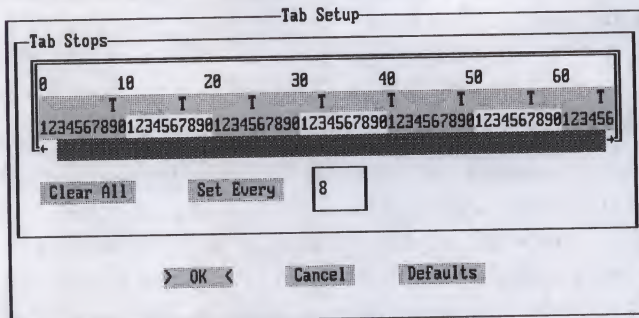
Selected

Tabs

Choose Tabs from the Setup menu to open the Tab Setup dialog box. Use this dialog box to set or clear tab stops for Reflection.

When the Online checkbox in the General Setup dialog box is selected, pressing **Tab** transmits a tab character to the host. When the Online check box is cleared (Reflection is in local mode), pressing **Tab** moves the cursor ahead to the next tab stop.

When the User Features Locked check box is selected in the General Setup dialog box, tab stops cannot be changed by the host.



Tab Setup Dialog Box

Tab Stops

This field is a ruler with which you can set tab stops at exact column locations. The scroll bars beneath the ruler allow you to scroll beyond the columns shown on screen out to 132 columns.

Use the mouse or $\leftarrow$ and $\rightarrow$ keys to move the cursor to the column number where you want the tab. Then click the left mouse button or press Spacebar to set a tab stop. A "T" under the ruler indicates the position of each tab stop.

To set tab stops at uniformly spaced positions, type a number in the Set Every box and choose Set Every.

Clear All

Choose this button to clear all tab settings from the Tab Stops ruler.

To clear a single tab stop, use the mouse or cursor keys to move over the "T" tab marker on the Tab Stops ruler. Then click the mouse or press Spacebar. Each click or press toggles between setting a tab and clearing it.

Set Every

Use this button to set tab stops at uniformly spaced positions and clear all other tab stops. Type the number in the text box, then choose this button (the default is 8).

Values: 0–131

Default: 8

Printer

Choose Printer from the Setup menu to open the Printer Setup dialog box. Use this dialog box to configure Reflection to print to a specific printer or to a disk file.

You may want to make changes to the Printer Setup dialog box even if you do not have a printer attached to the PC—setting Printer Interface to *NONE* indicates no printer is available and streamlines disk operations. Or you may want to configure Reflection to print to disk by setting the printer interface to *FILE* and entering a filename.

You generally do not need to make any setup changes if you have a local printer with a parallel connection to your PC (an IBM-compatible or an Epson), or if you are using a network printer.

Printer Setup

Printer Interface: PARALLEL	Print Mode: (*) Normal () Auto () Controller	Print Type: () Text (*) Graphics
File Name: []	Graphics Print: (*) Portrait () Landscape	Print Region: (*) Page () Region
Driver Name: PAM	Control Codes: IBM PRO	Print Size: (*) No change () Normal () Compress () Expand
[X] Auto Form Feed [] Pass Through Conversion	Lines Per Page: 8	Buffer Size (K): 8
OK Cancel Defaults Serial...		

Printer Setup Dialog Box

Printer Interface

This list box specifies the type of printer interface, if any, through which the printer is attached to the PC. *PARALLEL* indicates that the printer uses parallel printer adapter 1 on the IBM PC. Reflection supports parallel ports 1 to 4.

If you are using a serial printer, select the appropriate serial port, 1–8. An AT or compatible can have up to 4 ports, while a PS/2 can have up to 8. Jumpers on the serial port boards determine their setup; check your serial board documentation. The baud rate, flow control, data bits/parity, and stop bits in the Serial Printer Setup dialog box must also be correctly configured if you are using a serial printer. After you have selected a serial value in this list box, choose the Serial command button to open the Serial Printer Setup dialog box (page 283).

You can route your printing to a disk file by selecting *FILE* from the list box. This displays the Open File dialog box, from which you can select an existing file or type the name of a new file. When printing to an existing file, you must choose whether to overwrite the existing data or append the new data to it. As soon as you choose OK in the Printer Setup dialog box, the file you named is opened. See page 329 for more information on how to use this feature.

If you specify *NONE*, for no printer, no further setup is necessary.

Values: <i>PARALLEL</i> (default)	<i>SERIAL-1</i>
<i>PARALLEL-2</i>	<i>SERIAL-2</i>
<i>PARALLEL-3</i>	<i>SERIAL-3</i>
<i>PARALLEL-4</i>	<i>SERIAL-4</i>
<i>DRIVER</i>	<i>SERIAL-5</i>
<i>FILE</i>	<i>SERIAL-6</i>
<i>NONE</i>	<i>SERIAL-7</i>
	<i>SERIAL-8</i>

Reflection command language equivalent:

```
SET PRINTER-INTERFACE <value>
```

File Name

If you select *FILE* as your Printer Interface, all of your printing is routed to a disk file. Enter the name of that file (a maximum of 57 characters including path name) in this text box. As soon as you choose OK, the file you named is opened.

The file is closed when you do any of the following:

- ▲ Choose Close Printer from the File menu
- ▲ Press **[F4]**, Logging, at the main menu labels, and then toggle To Prt off
- ▲ Enter a different name in the File Name field
- ▲ Set Printer Interface to a value other than *FILE*
- ▲ Exit Reflection (**[Alt]-[X]**)
- ▲ Type `CLOSE PRINTER` on the command line

See page 329 for an example of how to use this feature.

Values: *<valid DOS filespec>*

Default: *N/A*

Reflection command language equivalent:

```
SET PRINTER-FILE "<string>"
```

For example, to use Reflection command language to set the filename to `C:\ADMIN\MAIL\SCREENS.TXT`, type the following on the command line:

```
SET PRINTER-FILE "C:\\ADMIN\\MAIL\\SCREENS.TXT"
```

The file specification is a quoted string; the double backslash (`\\`) is necessary because backslash is the default literal escape character.

Driver Name

If you select *DRIVER* in the Printer Interface box, enter the proper driver name here. *PRN* is the default shown; you can default to whatever mode settings you have defined under DOS by selecting another DOS device name (*LPT1*, *LPT2*, or *LPT3*).

Value: *<Device name>*

Default: *PRN*

Reflection command language equivalent:

```
SET PRINTER-DRIVER-NAME <string>
```

For example, to set the printer driver to *LPT2*, type the following on the command line:

```
SET PRINTER-DRIVER-NAME "LPT2"
```


Control Codes

This list box specifies which control codes, if any, that the printer uses to enable and disable expanded and compressed printing. If the printer does not have these features, select the value *OTHER*.

Reflection attempts to translate characters to the character set of your attached printer. It uses the selection you have made for Control Codes to determine which character set is available on your printer.

The Control Codes selection also defines what codes the printer uses to perform functions such as begining or ending compressed print. For example, selecting *IBM PRO* tells Reflection how to control the printer, and that the printer's font matches the font active in the PC.

Reflection makes the following assumptions about the character set (font) available on your printer, based on the value of Control Codes:

<i>DEC</i>	MCS 8-bit
<i>OTHER</i>	IBM-PC 8-bit (includes line drawing characters)

The PaintJet and DeskJet 500C printers are supported in Reflection 4 when doing a graphics screen dump. Change Control Codes to *PAINTJET* or *DJET500C*. Also see Print Background on page 267.

Values: *IBM PRO* (default)

OKIDATA

ANSI

HP

DJET500C

TOSHIBA

DEC

PAINTJET

IBM/EPSON

OTHER

Reflection command language equivalent:

`SET PRINTER-CONTROL <value>`

Printer Control Codes

Printer	Expanded	Compressed	Normal
Proprietary	$D_{C2}E_{SC}W^{S_{OH}}$	$E_{SC}W^{N_{UL}S_I}$	$E_{SC}W^{N_{UL}D_{C2}}$
Okidata	U_S	C_{AN}	G_S^{RS}
Ansi (Tally)	$E_{SC}[\emptyset w]$	$E_{SC}[6w]$	$E_{SC}[4w]$
HP	$E_{SC}\&k1S$	$E_{SC}\&k2S$	$E_{SC}\&k\emptyset S$
Toshiba	$E_{SC}!$	$E_{SC}[$	$E_{SC}] E_{SC}"$
DEC	$E_{SC}[5w]$	$E_{SC}[4w]$	$E_{SC}[\emptyset w]$
PaintJet	N/A	$E_{SC}\&k2S$	$E_{SC}\&k\emptyset S$
IBM / Epson	$D_{C4}D_{C2}S_O$	$D_{C4}D_{C2}S_I$	$D_{C4}D_{C2}$
DeskJet 500C	$E_{SC}(S6H)$	$E_{SC}(S14H)$	$E_{SC}(S10H)$
Other	(no codes)	(no codes)	(no codes)

If Control Codes is set to *PAINTJET* or *DJET500C*, by default the printer is reset (with $E_{SC}E$) before printing begins. You can reverse this behavior with the following command: `SET GRAPHICS-PRINT-RESET NO`.

See pages 529 and 532 for a definition of each display control code.

Auto Form Feed

When this check box is selected, Reflection automatically advances the paper to the top of a form after a print-screen operation invoked with either `[PrtSc]` or `[Alt]-[PrtSc]`. With a DOS print screen ((right) `[Shift]-[PrtSc]`) the value of this field is ignored.)

Values: *Selected* (default)
Cleared

Reflection command language equivalent:
`SET AUTO-FORM-FEED {YES | NO}`

Control function equivalent:
`DECPFF` See page 580

Pass Through Conversion

Reflection normally makes no attempt to translate characters sent directly from the host to the printer. In pass through printing (also known as *printer controller mode* or *pass through mode*) data is sent to the printer without appearing on the display. This check box controls whether Reflection should attempt to translate data when a pass through method of printing is used.

If your host software understands the special requirements of PC printers, clear this check box (the default). When this check box is selected, one of the following occurs, depending on how you have configured Control Codes:

DEC	Data is unaltered and control functions are stripped. If <i>Use NRC (7-Bit) Chars</i> is selected, the NRC translation is still done.
(all other choices)	8-bit characters are converted from MCS to the current PC code page and control functions are stripped.
Values:	<i>Selected</i> <i>Cleared</i> (default)

Reflection command language equivalent:

SET PRINTER-PASSTHRU-CONV {YES | NO}

Print Mode

Reflection offers three printer modes. *Normal* allows print functions to be initiated from the keyboard. *Auto* (also known as *Logging*) gives control of the printer to the host; the current line is printed whenever a L_F , F_F or V_T is received from the host. *Controller* (also known as *Pass Through*) allows data to be printed without displaying it.

Values: *Normal* (default)
Auto
Controller

Related Reflection command:

SET AUTO-PRINT {YES | NO}

Control function equivalent:

MC See page 581

Graphics Print (R2 only)

These option buttons control the page orientation of a graphics printout. Landscape (printing in horizontal mode) produces a larger, more readable printout on some printers. For Reflection 4, use Print Mode in the Graphics Printing Setup dialog box.

Values: *Portrait* (default)
Landscape

Reflection command language equivalent:

SET GRAPHICS-PRINT <value>

Lines Per Page

This list box determines how often a form feed is performed on the printer. Lines Per Page applies to logging, screen copy functions, and the PRINT command. It does not affect pass through mode or the print screen functions. The line counter is reset by a communications reset, soft reset, hard reset and each time Reflection is started. Form feeds within a file being printed are also performed. When this field is set to 0, form feeds occur only if they are specified within the text file being printed.

Values: 0–999 lines
Default: 0

Buffer Size

This text box sets aside a portion of memory for printer buffering. This is useful if your printer is slower than the communications link that you are using, or if you copy a large part of display memory to the printer. You can continue typing (while still running Reflection) while the text is being printed.

The first time you specify a printer buffer, the amount of memory requested is taken from whatever is free in display memory. An error message informs you if less memory is allocated than requested.

Values: 0–255 K bytes
Default: 0

Print Type

A print screen operation in Reflection (**Alt**-**PrtSc** by default) normally sends the text on your screen to the printer. When you run Reflection 2 in bit-mapped mode (with the /B132 startup switch), explained on page 29), you can configure Reflection to send a graphics image (double-high characters, for instance) to the printer. Set Control Codes to a value other than *DEC*, and set this field to *Graphics*.

When the *Text* option button is selected, only a text version of the image on the screen is sent to the printer.

Values: *Text* (default)
Graphics

Reflection command language equivalent:
SET PRINT-GRAPHICS {YES | NO}

Print Region

When a screen print operation is performed, these option buttons determine how much of the screen is printed. Selecting *Page* causes Reflection to print the entire screen. Selecting *Region* causes Reflection to print only the scrolling region, as defined by the top and bottom margins.

Values: *Page* (default)
Region

Control function equivalent:
DECPEX See page 580

Print Size

These option buttons determine the size of the printed output. If *Normal*, *Compress*, or *Expand* is specified, the control code listed in the table on page 279 is sent to the printer when the next print operation is initiated. If the printer is already configured for the correct style, simply select *No Change*: Reflection sends no special control codes, so that you can control the printer independent of Reflection.

Values: *No Change* (default)
Normal
Compress
Expand

To specify a maximum line width for each of the print sizes (*Normal*, *Compress*, and *Expand*), you must use the Reflection SET parameters listed below. The default for each one is 256. If a line longer than the maximum is encountered, Reflection automatically goes to the next line. This function happens in addition to any wrapping that the host may do. See "Printing Wide Reports" on page 333.

SET LINE-WIDTH-COMPRESSED <40-9999>

SET LINE-WIDTH-EXPANDED <40-9999>

SET LINE-WIDTH-NORMAL <40-9999>

Serial

Choose the Serial button to open the Serial Printer Setup dialog box. Use this dialog box to configure settings for your serial printer. This button is dimmed unless you have selected a serial printer in the Printer Interface box of the Printer Setup dialog box (page 276).

An AT or compatible PC can have up to 4 serial ports, while a PS/2 can have up to 8 serial ports. Jumpers on the serial port boards determine how they are set; check your serial board documentation. The baud rate, flow control, and stop bits must be correctly configured if you are using a serial printer.

Serial Printer Setup

Baud Rate 9600

Data Bits/Parity 8/NONE

Flow Control XON/XOFF

Stop Bits
(*) 1 () 2

> OK < Cancel Defaults

Serial Printer Setup Dialog Box

Baud Rate

Use this list box to select the baud rate for your serial printer. It specifies the speed at which Reflection transmits data through the serial port.

Values: 110 1800 19200
 150 2400 38400
 300 4800 57600
 600 9600 115200
 1200 14400

Default: 9600

Reflection command language equivalent:

SET PRINTER-BAUD <value>

Data Bits/Parity

Use this list box to select the character format used for communications. Reflection can transmit 7 or 8 data-bits for each character. The transmitter can optionally add a parity bit to the data-bits to provide error-checking. Reflection's data-bits and parity must match that of the printer link being used. To use the multinational character set or 8-bit controls, 8 data-bits must be selected.

Values: 7/SPACE (or *zeros* parity)
 7/MARK (or *ones* parity)
 7/EVEN
 7/ODD
 7/NONE
 8/EVEN
 8/ODD
 8/NONE (default)

Reflection command language equivalent:

SET PRINTER-DATA-BITS-PARITY <value>

Flow Control

Use this list box to specify how the flow of data from Reflection to the serial printer is controlled. Refer to the printer documentation to determine the correct value.

Values: XON/XOFF (default)	When the printer's buffer is nearly full, it sends an ASCII DC3 (XOFF) character to the computer. When the printer is ready for more data, it sends an ASCII DC1 (XON) to the computer.
ETX/ACK	After sending each 250-character block of data to the printer, the computer sends an ASCII ETX character. The printer sends an ASCII ACK character to the computer when it is ready for another block.
DSR	The computer sends characters to the printer as long as the RS-232 DSR signal (pin 6) is active (<i>true</i>). The printer sets the line <i>false</i> when it is not ready for more data.
CTS	The computer sends characters to the printer as long as the RS-232 CTS signal (pin 5) is active (<i>true</i>). The printer sets the line <i>false</i> when it is not ready for more data.
NONE	The serial printer has no way to stop and start the flow of data from the computer.

Reflection command language equivalent:

```
SET PRINTER-FLOW-CONTROL <value>
```

Stop Bits

Every character is followed by either one or two stop bits. Specify one stop bit for all baud rates other than 110 baud, and two stop bits for 110 baud, unless you are positive that your host system or serial device requires otherwise.

Values: 1 (default)
2

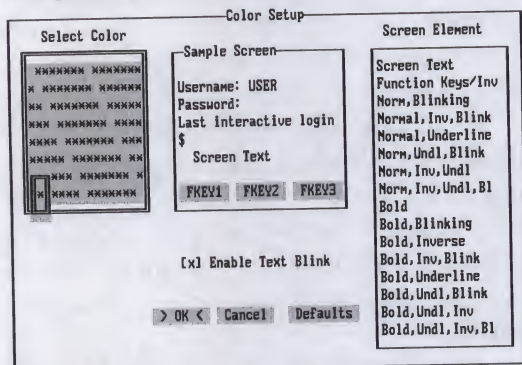
Reflection command language equivalent:

```
SET PRINTER-STOPBITS <value>
```

Color

Choose Color from the Setup menu to open the Color Setup dialog box. Use this dialog box to change the colors of the screen, the function key labels (if displayed), and various host attributes. You cannot change the color of Reflection's menu bar, menus, or dialog boxes.

Note: In Reflection 4, this dialog box controls only text-mode color attributes. To change color settings when Reflection 4 is in graphics mode, use the Graphics Color Setup dialog box on page 260. ▲



Color Setup Dialog Box

Select Color

Use this field to select the foreground color (shown by an asterisk) and background color for the corresponding item in the Screen Element list box. As you use the mouse or cursor keys to move from one color selection to another, notice that the changes are shown on the sample screen.

Screen Element

Use this list box to select color attributes for three separate parts of the screen: *Screen* selects foreground and background colors. *Function Keys/Inv* selects foreground and background colors for the function key labels (if displayed). The remaining 14 items in the Screen Element box control how data sent from the host is displayed. They include any combination of blinking, inverse video, underline, and bold intensity.

Enable Text Blink

Selecting this check box causes the color values on the right half of the Select Color field to blink; otherwise these values are bold. The default value for this check box is selected.

Sample Screen

This read-only field shows how the choices made in the Screen Element and Select Color fields look on the screen.

Softkeys

Choose Softkeys from the Setup menu to open the Softkeys Setup dialog box. Each function key ((F1)–(F8)) can be set up as a softkey, or a shortcut to repetitive key-stroke operations.

Once you have set up softkeys you can use them in one of two ways:

- ▲ With the Softkey labels shown at the bottom of the screen, simply press the corresponding function key. To display the softkey labels, select Softkeys as the Initial Labels in the Display Setup dialog box, or select Softkeys from the main menu labels at the bottom of the screen (if displayed).
- ▲ If the softkey labels are not displayed, press the Shift key and the function key that has been assigned a softkey shortcut.

Softkey definitions are automatically activated when you leave the Softkey Setup dialog box. To save softkey definitions, you must save them to a configuration file using the Save command on the File menu (page 180) or the Save As dialog box (page 181).

Softkey Setup Dialog Box

A softkey definition consists of the following:

- ▲ An 8-character label
- ▲ A string of up to 53 characters to be generated when the key is pressed (up to 80 characters can be generated if you define the softkeys using an escape sequence)
- ▲ An attribute that determines exactly how Reflection processes the string when the key is pressed

The escape sequences for defining softkeys and for displaying them are explained on page 541.

Softkey To Configure

This field selects the function key that will execute the softkey action you are defining. Press the function key you want to work with, or click it with the mouse. Notice that the function key you selected is now highlighted.

Label

Use this text box to enter the text that will be displayed on the softkey label at the bottom of the screen. A softkey label can be up to eight characters long.

Key String

Use this text box to enter the exact characters the softkey is to generate.

Include control functions and ASCII control codes by selecting the Insert Special Characters check box. If you insert special characters, you must use the  to exit this field.

Insert Special Characters

Select this check box if you need to insert special characters, such as ASCII control codes and control functions, in the Key String field. For example, to insert the ASCII control code for Tab in your key string, select this check box, then return to the Key String field and press the Tab key.

This check box is dimmed until you move the cursor to the Key String box. Be sure to clear this check box after you have finished entering special characters in the key string.

Attribute

Each softkey must have an attribute that governs how its key string is processed.

- | | |
|----------------|--|
| <i>Normal</i> | The string is treated exactly as if it had been entered from the keyboard. If Reflection is in local mode, the string is displayed on the screen, and embedded control functions are executed locally. In remote mode, the string is transmitted to the host computer, and is executed and displayed only if the host system echoes. |
| <i>Local</i> | The softkey string is executed locally but is not transmitted to the host system. |
| <i>Command</i> | The text entered in the definition field is treated as a single Reflection command. |

Softkey Applications

Set Attribute to *Normal* to:

- ▲ Store commonly used commands such as host or program run commands.

For instance, to get a directory listing of all the files on the host that have been added or changed since yesterday, enter the following in the definition field (select the Insert Special Characters check box to enter the carriage return at the end):

```
DIR/SINCE=YESTERDAY^R
```

Set Attribute to *Local* to:

- ▲ Set up a softkey to switch between active Connection Manager sessions. Use the escape sequence `^Esc&bN`.

Set Attribute to *Command* to:

- ▲ Execute commands that configure Reflection or perform various operations.

Four examples are given below:

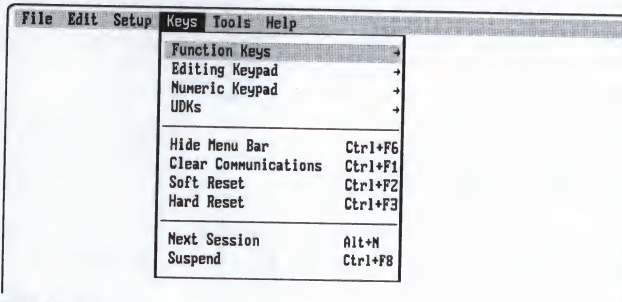
- To load a different configuration file, enter `LOAD MODEM.CFG` as the softkey definition.
- Do a backup of modified files in a subdirectory and save a log of the operation to `SAVEDOC.LOG`:

```
BACKUP C:\TEXT\*.DOC SAVEDOC /L:SAVEDOC.LOG
```

- Type `VERIFY CHANGED` in the softkey definition field. Pressing that softkey will then show you a list of the SET parameters that deviate from the Reflection defaults.
- Assume the file `LOGIN.RCL` is a Reflection command file that takes you through the login and password sequence. Enter `LOGIN.RCL` as the softkey definition.

Keys Menu

Reflection uses your PC keyboard to emulate a VT terminal keyboard. The first four commands on the Keys menu open cascading menus that let you carry out various VT terminal keyboard functions. Other commands hide the menu bar, perform reset operations, and control network sessions.



Keys Menu

Function Keys

The VT keyboard provides a top row of functions keys, **F1** through **F20**. On VT keyboards **F2** through **F5** provide local terminal functions and do not generate outgoing characters. To transmit a VT function from your PC, either choose the key from the Function Keys cascading menu, or use the corresponding keyboard shortcut shown on the menu.

File Edit Setup Keys Tools Help			
Function Keys	→	VtF1 (Hold)	ScrollLock
Editing Keypad	→	VtF5 (Break)	Ctrl+Pause
Numeric Keypad	→	VtF6	Alt+Six
UDKs	→	VtF7	Alt+Seven
		VtF8	Alt+Eight
		VtF9	Alt+Nine
		VtF10	Alt+Zero
Hide Menu Bar	Ctrl+F6	VtF11 (ESC)	Alt+Q
Clear Communications	Ctrl+F1	VtF12 (BS)	Alt+W
Soft Reset	Ctrl+F2	VtF13 (LF)	Alt+E
Hard Reset	Ctrl+F3	VtF14	Alt+R
		VtF15 (Help)	Alt+I
Next Session	Alt+N	VtF16 (Do)	Alt+Y
Suspend	Ctrl+F8	VtF17	Alt+U
		VtF18	Alt+I
		VtF19	Alt+O
		VtF20	Alt+P

Function Keys Cascading Menu

In most cases, the VT function keys behave the same way in Reflection as they do on a real terminal. Those that behave differently, based on a Reflection setting, are described below.

VtF1 Key (Hold)

The VT terminal's **[F1]** key (by default, **ScrollLock** in Reflection) pauses data on the screen when flow control is enabled. You can also use the keystroke **[Ctrl]-[S]** to pause data (a $^{DC}_3$ or XOFF is sent to the host) and **[Ctrl]-[Q]** to resume transmission (which sends a $^{DC}_1$ or XON).

When both Transmit Pacing and Receive Pacing in the Advanced Datatcomm Setup dialog box (page 227) are set to *NONE*, Hold Screen has no effect.

VtF5 Key (Break)

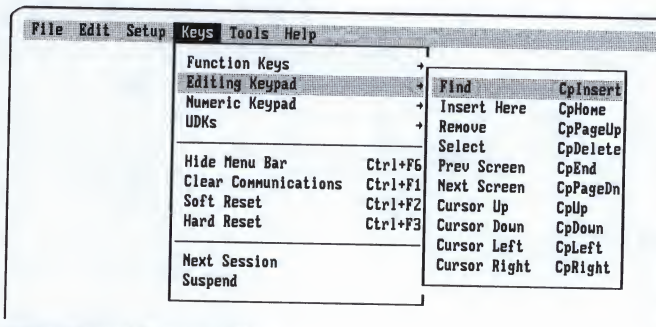
The VT terminal's **[F5]** key (by default, the **[Ctrl]-[Break]** keystroke in Reflection) transmits a break to the host; the default break length is two-tenths of a second. The length of the break can be set from 0–9999 milliseconds using the Reflection SET BREAK-LENGTH command.

VtF12 Key (Backspace)

The VT terminal's **[F12]** key generates a BS character in VT52 and VT100 modes (in other terminal modes, it sends the control function CS_{I24n}). The setting of Backspace Key Sends in the Keyboard Setup dialog box (page 268) does not affect this function.

Editing Keypad

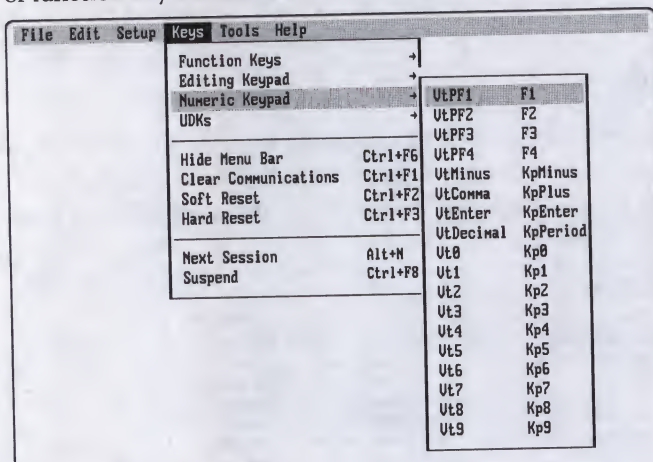
The VT keyboard provides a block of six editing keys and four cursor movement keys. To transmit a VT editing key from your PC keyboard, either choose the key from the Editing Keypad cascading menu, or use the corresponding cursor pad shortcut shown on the menu.



Editing Keypad Cascading Menu

Numeric Keypad

The VT keyboard's numeric keypad includes both numerical keys and the PF series of keys. To transmit a VT numeric key from your PC keyboard, either choose the key from the Numeric Keypad cascading menu, or use the corresponding numeric keypad or function key shortcut shown on the menu.

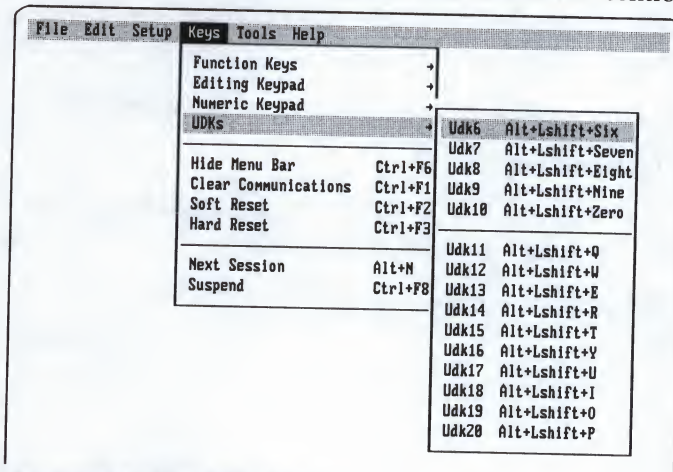


Numeric Keypad Cascading Menu

UDKs

User-defined keys (UDKs) transmit information to the host, and are defined by the DECUDK device control string. Once a UDK is defined, you can activate it by choosing it from the UDKs cascading menu, or by using the corresponding keyboard shortcut shown on the menu. UDKs are available only in VT200 mode and higher.

See page 575 for information on the DECUDK device control string.



User Defined Keys Cascading Menu

Hide Menu Bar

Choose this command to temporarily hide the menu bar. A check mark next to this command indicates this command is active. Pressing **[Alt]** once the menu bar is hidden will temporarily display the menu bar. To permanently hide the menu bar, use the Initial Menu Bar option in the Display Setup dialog box (see page 240).

The keyboard shortcut for Hide Menu Bar is **[Ctrl]-[F6]**.

Clear Communications

Choosing Clear Communications performs a communications reset that does the following:

- ▲ Emits a beep
- ▲ Cancels any escape sequence processing, including pass through mode
- ▲ Initializes the serial communications ports to their last activated values and clears the receive buffer
- ▲ Cancels any print operation in progress and clears the printer buffer
- ▲ Clears the keyboard buffer
- ▲ Sends an XON to the host if the Receive Pacing list box in the Advanced Datacomm Setup dialog has a value of XON/XOFF

The keyboard shortcut for Clear Comm is **Ctrl-F1**.

Soft Reset

The Soft Reset command sets the following setup values to their defaults (shown in parentheses):

- ▲ Autowrap (disabled)
- ▲ Cursor keys (normal—keys generate cursor movement)
- ▲ Insert mode (off)
- ▲ Keyboard (unlocked)
- ▲ Numeric keypad mode (keys generate numbers)
- ▲ Origin mode (off—cursor at upper left of screen)

- ▲ Text cursor (enabled)
- ▲ Character sets
- ▲ Saved cursor state (defaults)
- ▲ Active display (main)
- ▲ Character attributes (normal)
- ▲ Selective erase attribute (normal)
- ▲ Top/bottom margins (whole screen)
- ▲ Use national replacement characters (disabled)

The keyboard shortcut for Soft Reset is **Ctrl-F2**.

Hard Reset

The Hard Reset command does the following:

- ▲ Stops any Reflection command that is currently executing
- ▲ Stops a file transfer
- ▲ Cancels any escape sequence processing, including pass through mode
- ▲ Clears display and page memory and homes the cursor
- ▲ Clears the keyboard buffer
- ▲ Clears the UDKs
- ▲ Displays the main menu labels at the bottom of the screen
- ▲ Emits a beep
- ▲ Performs a communications disconnect, which initializes the serial communications ports and clears the receive buffer
- ▲ Sends an XON to the host
- ▲ Sets terminal setup parameters to the last activated values

- ▲ Sets Status Line in the Display Setup dialog box to to its last saved (not activated) value
- ▲ Sets character sets, display enhancements, and selective erase to their default values

The keyboard shortcut for Hard Reset is **(Ctrl)-(F3)**.

Next Session

This command moves between network sessions without returning to the Connection Manager prompt. Reflection creates a temporary “state” file (similar to the file created when you exit Reflection with **(Alt)-(B)**). All session-specific information is restored when you return to the session.

This command applies to the Connection Types *CON-MGR*, *LAT*, and *TEL-MGR*. The command remains dimmed until you have established multiple sessions.

The keyboard shortcut for Next Session is **(Alt)-(N)**.

Suspend

This command suspends an active network session. The command remains dimmed until you have established a session. This command applies to the Connection Types *CON-MGR*, *LAT*, and *TEL-MGR*. The effect of this command depends upon your Reflection Network Series version:

- ▲ Users of version 1.1 and earlier are returned to “CI (command interpreter) mode.” The prompt appears as one of the following:

```
Local>
LOCAL>
TEL-MGR>
```

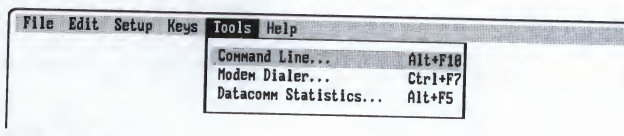
- ▲ Users of version 2.0 and higher are returned to the Connection Manager (*CONMGR>*) prompt.

The keyboard shortcut for Suspend is **(Ctrl)-(F8)**.

Tools Menu

The Tools menu provides commands to display the Reflection command line, the Modem Dialer dialog box, and the Datacomm Statistics dialog box.

Tools Menu



Tools Menu

Command Line

Choose Command Line to display the command line interface for Reflection command language.

The keyboard shortcut for the command line is **Alt-F10**.



Command Line

The Reflection command language is documented in the *Reflection Command Language* manual. Command language allows you to:

- ▲ Automate a host connection
- ▲ Send and receive files using any of a variety of supported file transfer protocols
- ▲ Set Reflection configuration values
- ▲ Transmit data to the host
- ▲ List, print, copy, and delete PC files
- ▲ Change the current drive and path

Reflection's command line is similar to the DOS command line in that you type commands on the command line and execute them by pressing **Enter ↵**. Any of Reflection's commands can be executed from the command line. You can also type the name of a Reflection command file to execute all the commands contained in that file.

The command line is unavailable when other elements of the interface—the menu bar, a menu, or a dialog box—are in use.

Editing on the Command Line

You can use various keys to enter, re-enter, or alter text on the command line. The following editing keystrokes are available:

- F3** When you type a command and press **Enter ↵**, the line is stored in a previous line buffer. This keystroke displays the entire previous line. The cursor advances to the end of the command line.
- F6** Erases any text from the cursor position to the end of the command line.
- Del** Deletes the character at the current cursor position on the command line.
- Ins** Turns on insert mode within the command line. Insert mode allows the insertion of characters onto the current command line.
- ←** Moves the cursor one position to the left on the command line; does not overwrite the character at the new cursor position.
- Moves the cursor one position to the right on the command line; does not overwrite the character at the new cursor position.
- Home** Moves the cursor to the beginning of the command line.
- End** Moves the cursor to the right of the last character on the command line.

Responding to Errors

If you enter an incorrect command on the command line, Reflection responds with an error message. There are two ways to proceed:

- ▲ Press **(Enter ↵)** to acknowledge the error. Then retype the command and press **(Enter ↵)** a second time to execute it.
- ▲ Press **(F10)** or **(Esc)** to exit the command line.

Getting Help on Command Language

There are two ways to get online help for command language:

- ▲ Choose Topics from the Help menu to display the Help dialog box. From the list of topics select "Reflection Command Language."
- ▲ Type `HELP <item>` on the command line for a specific command, function, or SET parameter, then press **(Enter ↵)**.

Interrupting Commands

You may occasionally find it necessary to interrupt a command. Most commands (or command files) can be aborted with the **(Ctrl)-[Y]** keystroke. However, this keystroke won't work if SET DISABLE-INTERRUPT is set to YES. For more information, see the *Reflection Command Language* manual.

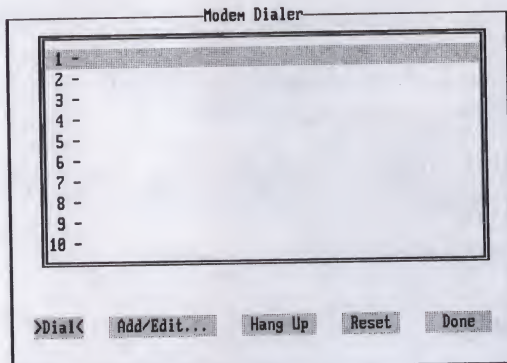
Exiting the Command Line

When you have no further commands to enter, press **(Esc)** or **(F10)**. This exits the command line. If the command line is blank, you can also press **(Enter ↵)** to exit.

Modem Dialer

Choose Modem Dialer to display the Modem Dialer dialog box. The Modem Dialer provides modem dialing, reset, and hang up services.

The keyboard shortcut for the Modem Dialer dialog box is **(Ctrl)-[F7]**.



Modem Dialer Dialog Box

Modem Dialer List Box

The Modem Dialer dialog box includes a list box with items labeled 1 through 10. You can enter information for dialing up to 10 host systems or BBS services using the Modem Dialer.

To select a particular item from the list box, use $\uparrow$ and $\downarrow$, or use your mouse. Your selection determines which list box entry is used when you choose the Dial or Add/Edit button.

Dial

Choose this button to establish a modem connection using the system entry you selected in the Modem Dialer list box.

Add/Edit

Choose this button to add or edit the system entry you selected in the Modem Dialer list box. The Modem Dialer Setup dialog box is displayed. This dialog box is described on page 303.

Hang Up

Choose this button to hang up the modem.

Reset

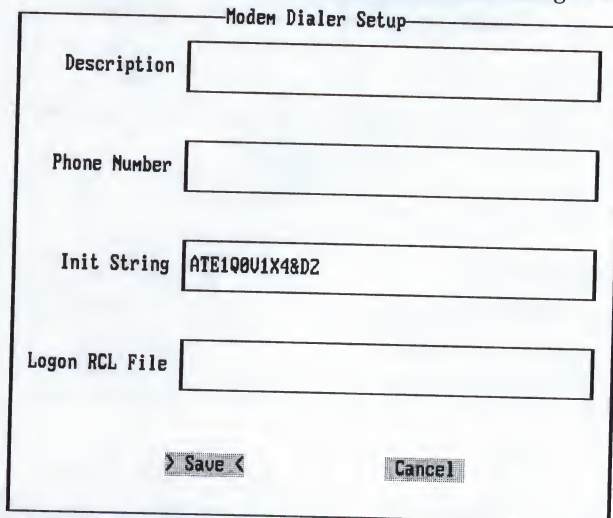
Choose this button to reset the modem.

Done

Choose this button to close the Modem Dialer dialog box.

Modem Dialer Setup

When you choose Add/Edit in the Modem Dialer dialog box, the Modem Dialer Setup dialog box is displayed. Use the fields in this dialog box to add or edit the system entry you selected in the Modem Dialer dialog box.



The image shows a dialog box titled "Modem Dialer Setup". It contains four text input fields with labels to their left: "Description", "Phone Number", "Init String", and "Logon RCL File". The "Init String" field contains the text "ATE1Q0U1X4&D2". At the bottom of the dialog box, there are two buttons: "Save" and "Cancel".

Modem Dialer Setup Dialog Box

Description

The text that you enter here is displayed in the Modem Dialer dialog box to identify the entry you selected. For example, if you select 3 and type WRQ BBS in this field, the list box entry will appear as follows:

3 - WRQ BBS

Phone Number

Enter the telephone number of the host modem or BBS service. When entering the number, use a comma between prefix numbers to insert pauses into the dialing. For example, to enter the number for WRQ's bulletin board, type:

1,206,2170145

Init String

A default modem initialization string appears in this field:

ATE1Q0V1X4&D2

This initialization string configures the modem in the following way:

- ▲ Modem echo is enabled
- ▲ Modem result codes indicating the connection, speed, dial tone, and busy signal are provided
- ▲ Modem result codes are given in words
- ▲ Modem disconnect is enabled

If you are dialing a host system that requires a special modem initialization string, enter the required string in this text box.

This is an optional field. You can also delete the default string and leave the field blank.

Logon RCL File

Use this field to invoke your own Reflection command language file that automates your logon procedure. The file you name in this field will be executed if a modem connection is established. To invoke a file called LOGON.RCL in the \REFLECT directory, type:

C:\REFLECT\LOGON.RCL

This is an optional field which can be left blank.

Save

Choose this button to save your new (or edited) entry to RNUMBERS.DAT, the modem dialer data file.

Cancel

Choose this button to close the dialog box without modifying RNUMBERS.DAT.

Modem Dialer Support Files

Two Reflection files support the Modem Dialer:

DIALHOST.RCL This Reflection command language file is installed in your Reflection directory. It supports modem dialer operations in the following ways:

- ▲ It sends dial, reset, and hang up commands to your modem
- ▲ It "waits" for result codes from your modem
- ▲ It displays call, reset, and hang up progress messages on your screen
- ▲ It invokes a Logon RCL File if you have specified one

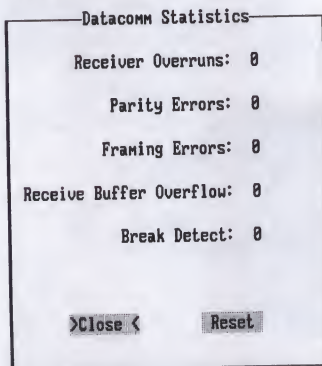
RNUMBERS.DAT This data file holds the system entries you make using the Modem Dialer Setup dialog box. It is created by Reflection the first time you open the Modem Dialer dialog box.

If you have a `SET REFLECT<n>` command in your AUTOEXEC.BAT file, RNUMBERS.DAT is placed in the specified directory. Otherwise, the file will be placed in the directory where your Reflection program resides.

Datacomm Statistics

Choose Datacomm Statistics to display the Datacomm Statistics dialog box. This dialog box provides information on communication errors. Non-zero values in the fields indicate that problems have occurred in data reception. The fields in this dialog box are read-only.

The keyboard shortcut for Datacomm Statistics is **Alt-F5**.



Datacomm Statistics Dialog Box

Receiver Overruns

When a character arrives at the serial port from the host computer, Reflection must read the character before a subsequent character overwrites it. If a character is overwritten before it can be read, a receiver overrun is reported.

Troubleshooting

Rename your CONFIG.SYS and AUTOEXEC.BAT files, and reboot your PC. Run Reflection and connect to your host computer. If receiver overruns are eliminated, this means that device driver or memory-resident programs loaded when the machine boots are contributing to the problem. To determine which driver or program is to blame, reinstate your boot-up files one line at a time until the problem returns.

Parity Errors

This number is increased only if the Check Parity check box in the Datacomm Setup dialog box (page 224) is selected. Parity errors are much more likely to occur with a modem connection than with a direct connection. Make sure Reflection's parity setting matches that of the host computer or intermediary device. You should normally clear the Check Parity check box.

Framing Errors

This error usually indicates that the baud rate of the PC is different from that of the host computer. It can also occur if the number of stop bits is incorrectly configured, or the cables between the PC and host are noisy or very long.

Receive Buffer Overflow

Reflection has a buffer in which characters received from the host computer are held until they can be processed. If Reflection cannot keep up with the incoming data, the buffer fills up and an overflow occurs. Try setting Receive Pacing in the Advanced Datacomm Setup dialog box (page 226) to *XON/XOFF*. If this does not solve the problem, you have to find out what kind of flow control the host accepts.

Break Detect

This counter is incremented whenever a break in communication is detected. Breaks are usually an indication that the connection to the host is bad—either the phone lines are noisy or the cables are bad. It could also mean that the communication line is set at the wrong baud rate.

Close

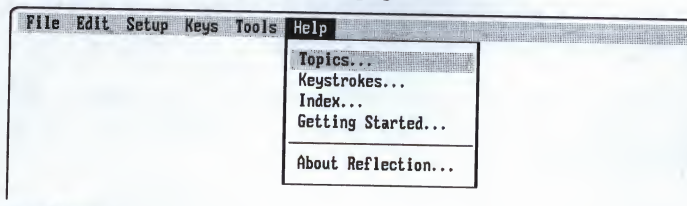
Choose this button to close the Datacomm Statistics dialog box.

Reset

Choose this button to return all the values to zero.

Help Menu

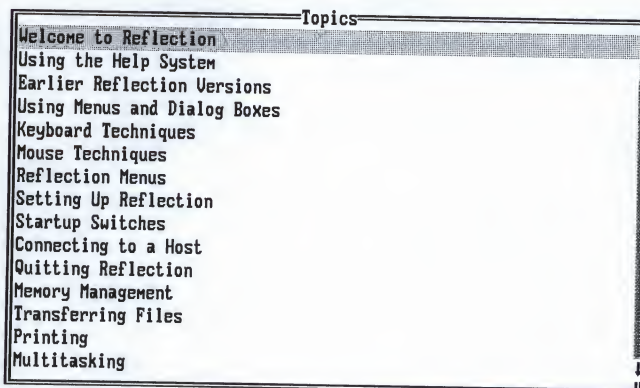
Choose Help from the Menu bar to display the Help menu. Use Reflection's online help system to get information on over 200 topics. For information on how to navigate in the help system, see page 312.



Help Menu

Topics

Choose Topics to open the Help Topics dialog box—a list of the major topics in the online help system. Selecting a topic from the list box displays that topic in the dialog box. To select a help topic, click it with the mouse or use the $\uparrow$ and $\downarrow$ keys to highlight the topic and press Enter $\downarrow$.



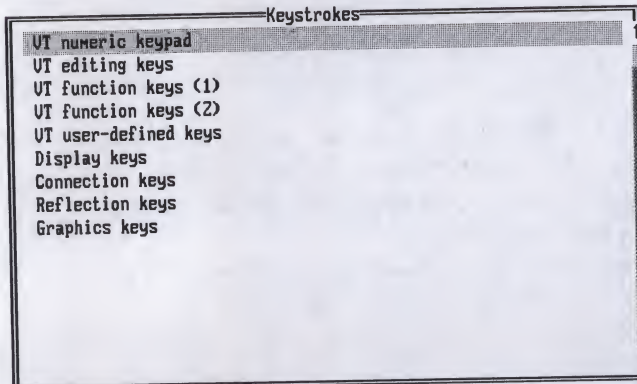
Help Topics Dialog Box

Keystrokes

Choose Keystrokes to open the Keystrokes Help dialog box. This dialog box shows which keystroke to press to execute Reflection and VT functions, and how functions have been mapped to keystrokes. When you first run Reflection, the default keystrokes are shown; if keyboard mapping is in effect, the changes are shown in this dialog box. Custom Keys appears as a topic only if customized keystrokes are present in the current configuration file.

To select a keystrokes help topic, click it with the mouse or use the $\rightarrow$ and $\leftarrow$ keys to highlight the topic and press Enter . You can also use PgUp and PgDn to scroll through the keystrokes help topics.

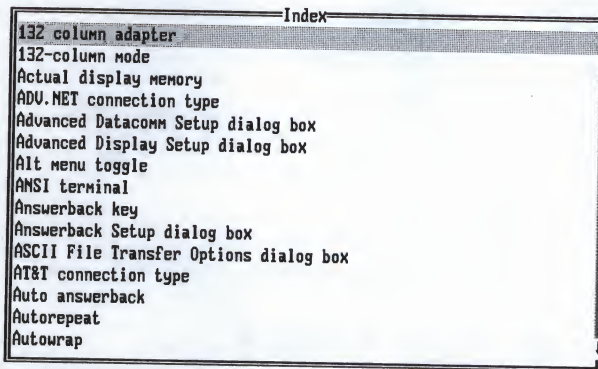
The VT keystrokes that are described in the Keystrokes Help dialog box can be performed from the Keys menu. See page 291.



Keystrokes Help Dialog Box

Index

Choose Index to display an alphabetical listing of all Reflection help topics. Selecting an index entry displays that help topic in the Help dialog box. To select an index entry, click it with the mouse or use the **↑** and **↓** keys to highlight the index entry and press **Enter**.



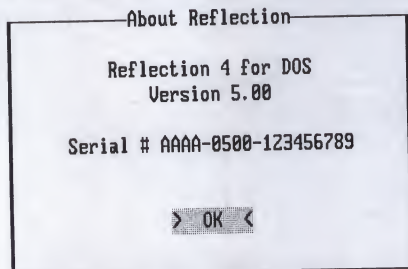
Help Index Dialog Box

Getting Started

Choose Getting Started to display an introductory topic that explains how to use Reflection's graphical user interface, and how to use the online help system.

About Reflection

Choose About Reflection to display information about the version of Reflection you are using, including the serial number for your product.



About Reflection Message Box

Moving Around in the Help System

Reflection provides several methods for navigating within the help system. If a help topic is longer than the help list box, you can scroll through the information by using the **↑** and **↓** keys and the **PgUp** and **PgDn** keys, or by clicking the scroll bar to the left of the window with the mouse.

Hypertext Links

When you are in a help topic, you can use the red highlighted hypertext links to jump directly to another topic. As you use the hypertext links to move from one help topic to another, Reflection remembers the sequence and lets you step back through the topics.

To use a hypertext link, click it with the mouse, or press **←** or **→** until the hypertext is highlighted and then press **Enter**. If there is more than one hypertext link displayed on the screen, the arrow keys cycle through each of them.

Help Command Buttons

Use the following command buttons at the bottom of the Help dialog box to move around in the help system:

Done	Exits the help system
Topics	Opens the Help Topics dialog box
Keystrokes	Opens the Keystrokes Help dialog box
Getting Started	Opens the Getting Started dialog box
Index	Opens the Help Index dialog box
Back	Returns you to the help topic you were previous viewing. You can use this to sequentially step back through a series of help topics, which is helpful if you have used hypertext links to jump from topic to topic. This command button is dimmed if you have not looked at any help topics, or if you have completed retracing your steps through the help system.

Status Line Help

Status line help is available whenever the Reflection menu bar, a menu, or a dialog box is displayed. Status line help is shown at the bottom of the screen and indicates the keystrokes available for the dialog box or menu you are in.

Operations

This section provides information on various Reflection operations including:

- ▲ Using Reflection as a pop-up terminal
- ▲ Printing with Reflection
- ▲ Allocating memory for optimal performance
- ▲ Working with display and page memory
- ▲ Using Reflection with other software, such as Microsoft Windows

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Reflection as a Pop-Up Terminal

Terminal emulation on your IBM PC or compatible means that your PC can do any operation a terminal can. With Reflection you simultaneously have a connection to your host computer as well as access to all the power of your PC.

Start Reflection from the DOS prompt by typing `R2` or `R4`. Hold down **[Alt]** and press the right-hand **[Shift]** key. This hot-key puts Reflection “in the background.” The DOS prompt appears and you can run other PC software at this point.

Whenever you need to have access to your host computer, use the hot-key to pop up Reflection. The letter “B” appears on the status line once Reflection has been placed in the background. You can choose another keystroke for the hot-key in the Keyboard Setup dialog box (see page 271).

Background Operations

When Reflection is placed in the background it continues running while you are using other programs on your PC. This means that you can do word processing or spreadsheet work on the PC, for instance, while Reflection runs as a terminal, transfers files, or executes Reflection command files. You can have:

- ▲ Background file transfers
- ▲ Background printing
- ▲ Background terminal operations
- ▲ Background command file execution

Configuration and Background

If you are using Reflection's background feature, you may want to configure Reflection to use less memory so there is more available for other applications. Reconfiguring Reflection to use less memory is described on page 335.

As you put Reflection in the background, it takes from DOS the amount of memory that it needs to run. If you then try to make setup changes that involve memory, they will not take effect:

- ▲ The value of Requested Display Memory in the Advanced Display Setup dialog box cannot be changed once Reflection is installed in the background.
- ▲ In Reflection 4, # Bit Planes Saved cannot be changed in the ReGIS Setup dialog box once Reflection has been installed in the background.
- ▲ In Reflection 2 bit-mapped and Reflection 4, Resolution Choice in the Video Options Setup dialog box cannot be changed once Reflection has been installed in the background.
- ▲ Macro Storage in the General Setup dialog box cannot be changed after Reflection has been installed in the background. This is the amount of memory allotted for storing ReGIS macrographs (in Reflection 4) and VT420 macros.

If you need to increase any of these values, either do so before placing Reflection in the background, or unload Reflection from memory using **[Alt]-[X]** or **[Alt]-[B]** and reload Reflection.

File Transfer

File transfers can sometimes take a while. Once you begin a transfer with Reflection, you can pop it into the background with the hot-key and have immediate access to your PC. Except for the flicker of drive lights, the transfer continues in the background unnoticed. A message is displayed on the foreground screen when a transfer completes or an error occurs.

If Reflection is transferring a file in the background, you may have problems if you are simultaneously trying to use that particular file in the foreground.

The Reflection *Command Language* manual explains how you can back up your PC to your VAX or UNIX host with Reflection while you use your PC locally.

Printing

Instead of tying up your PC while you print a file, use Reflection's command line to begin printing and then put Reflection in the background.

With Reflection in the foreground, choose Command Line from the Tools menu (or press **[Alt]-[F10]**) to get to the command line, type the following command, and press **[Enter]**:

```
PRINT <filespec>
```

Now use the hot-key and run another application while Reflection prints your file. Once Reflection is finished using the printer, your other applications again have access to it. (Printing something with a foreground application after Reflection has started printing in the background interferes with both print jobs.)

Terminal Operations

Reflection allows you to maintain a host connection even while you seem to be using PC-only programs. If you are logged on to the host, messages can be sent to you or you can have a host application program running. Reflection's display memory retains pages of text sent by the host, so you can toggle into Reflection at any time to view messages or work.

Command Files

Reflection's command language lets you program your PC. You can simplify predictable sequences, such as logging in, by incorporating them into a command file. Command files can be executed in the background to once again free up your PC. Examples of such files are MAIL.RCL and A1MAIL.RCL, which are included on your product disk; see below.

Because command files can be written that perform functions at certain times, you can set up a complete session with your host to begin and end at a specific time, all in the background. See the *Reflection Command Language* manual.

Note: If you are using floppy drives with command files, make sure there is a disk available to Reflection. The drive door must be closed, otherwise disk errors may cause your foreground application to freeze temporarily. For best results, use the hard drive when possible, or make sure a disk is available. ▲

Using the Mail Command Files

There are two sample Reflection command files that can be used to receive mail while you are running another PC application in the foreground:

- ▲ MAIL.RCL can receive VAX mail and phone messages on your PC.
- ▲ A1MAIL.RCL can receive ALL-IN-1 mail while you are working in the foreground.

To use either of the command files:

1. Run Reflection.
2. Log in to your VAX/VMS system.
3. Choose Command Line from the Tools menu (or press **Alt-F10**) to display the command line.
4. Enter MAIL.RCL or A1MAIL.RCL and press **Enter**.

Reflection places itself in background and returns you to the DOS command prompt. When Reflection detects that you have received mail or a phone message, it invokes the appropriate program (either the VAX mail or phone program for MAIL.RCL, and ALL-IN-1 for A1MAIL.RCL), and switches to the foreground. Reflection returns to background when you exit.

To terminate the command file, toggle Reflection into the foreground with the hot-key and press **Ctrl-C**.

SHELL vs. Background

The SHELL command was developed in Reflection to give you quick access to DOS and allow you to run other PC programs from within Reflection. There may be occasions when SHELL is more appropriate than background: when you want to invoke a DOS batch file from within a Reflection command file, for instance, or when you are toggling between Reflection and another application and you need direct access to DOS to run a third program or utility.

Note: The DOS command line editor that is part of DOS version 5.0, DOSKEY.COM, is temporarily disabled when you SHELL out to DOS. It is not affected by using the hot-key or exiting to DOS. ▲

If you want to use the SHELL command and Reflection's background feature together, you must first set aside some memory for this with the SET SHELL-MEMORY command at the command line. This must be done *before Reflection has been installed in the background* (the letter "B" should not appear on the status line).

Command Language

The following commands are related to using Reflection's pop-up feature. Refer to the *Command Language* manual for explanations of their uses.

ALERT <string>	SET GLOBAL-CAPS-SCROLL
BACKGROUND	SET GLOBAL-NUM-LOCK
EXIT	SET HOT-KEY
FGD	SET POPUP-ONLY
FOREGROUND	SET SHELL-MEMORY
HARDEXIT	SET VIDEO-BUFFER
SET ALERT	TSR
SET EXITS-DISABLED	

Background Notes

The following notes cover various aspects of background operation. Some are hints for easier use of background and some are cautions about potential problems or errors.

Putting Reflection in the Background

You can put Reflection in the background after you start the program (from the keyboard), or as you start it (at the DOS prompt).

From the keyboard

When Reflection is started, it is not automatically installed as a pop-up. The first use of the hot-key puts Reflection into the background. Once Reflection is "installed" in the background, there are three methods for toggling between the DOS environment and Reflection:

- ▲ **[Alt]-(right)[Shift]** (the hot-key)
- ▲ **[F8]** from the main menu labels
- ▲ The Reflection EXIT command

Only the hot-key returns Reflection to the foreground.

From the DOS prompt

You can load Reflection immediately into the background with the following command:

```
R2 /B  
R4 /B
```

In addition you can include a special configuration file (see page 432), a command file, or both. For example, the following command loads Reflection 2 using UNIX.CFG and immediately begins executing LOGIN.RCL:

```
R2 /B UNIX.CFG LOGIN.RCL
```

These run commands can also be included in your AUTOEXEC.BAT file.

Removing Reflection from Memory

If you need more memory in your PC, you can unload Reflection with **[Alt]-[X]** (exit to DOS) or **[Alt]-[B]** (state save, described on page 340) instead of using the hot-key. Reflection is then no longer available in memory; pressing the hot-key has no effect. To use Reflection again, simply reload it.

Directories

Reflection keeps track of which drive and directory it is in. Once it is installed in the background, DOS and Reflection keep track of their directories separately. Your foreground application and Reflection can be working in separate directories.

To confirm the current Reflection path, type **CD** on the command line. The current drive is always displayed to the left of the command line. If you are in the root directory, nothing is displayed when you execute the **CD** command.*

Other Pop-Ups with Reflection

Other memory-resident programs may not be compatible with Reflection once it has been put in the background. If Reflection has been installed as a pop-up program, bringing up other pop-ups within Reflection poses special problems and may not work. Removing Reflection from the background while other pop-ups are present may force you to reboot your PC.

Suppressing Multitasking

If you do not want Reflection to continue to function when it is in the background, type **SET POPUP-ONLY YES** on Reflection's command line. This value can be saved to a configuration file, so that Reflection can always be toggled in and out of background, but does not continue to process data in the background.

* If you remove Reflection's current directory (in DOS), you cannot change from that directory once you return to Reflection. Unload Reflection from memory with **Alt-X** and reload it.

Running Two Copies of Reflection

If you want to load two copies of Reflection, the second copy must be loaded with the /O switch. The background application multitasks, while the foreground copy (the second copy that was loaded) freezes any time the background copy is popped up.

Programmatic Control of Reflection

You can programmatically find out if Reflection is installed in the background, and also programmatically bring Reflection to the foreground. Earlier versions of Reflection (prior to version 4.2) used int 21 function DEh to do this. Since this is also used by Novell, we now use a different function (int 21h function 2Ah). Reflection still supports the old method—existing programs do not need to be changed—but the new one is recommended.

The recommended method for finding Reflection is:

```
mov     dx,0
mov     bp,0ABCDh
mov     ax,02A00h + "W"
int     21h
cmp     ax,"RQ"
je      Reflection_is_out_there
```

This method requires that two registers other than AX contain specific values—DX must equal 0, and BP must equal ABCDh.

To make the call that brings Reflection to the foreground, use the following:

```
mov     dx,0
mov     bp,0ABCDh
mov     ax,02A00h + "Q"
int     21h
cmp     ax,"WR"
je      Reflection_popped_up
```

This chapter introduces printing in Reflection and provides detailed instructions for the following:

- ▲ Printing the contents of (non-graphics) display memory
- ▲ Printing to a disk file
- ▲ Printing a PC file
- ▲ Printing data received from a host computer

Selecting the Printer as the Destination

Before proceeding, make sure that Reflection is configured for a printer. The default configuration assumes a parallel printer with IBM PRO codes. Refer to the *Reflection User Guide* and to page 275 for information on the Printer Setup dialog box.

If Reflection has been properly configured for a printer, the printer is automatically selected as a destination device when Reflection is run.

To check that the To Prnt selection is active, use these steps:

1. Press **[F10]** to display the main menu labels.
2. Press **[F4]**, Logging.
3. Look for the asterisk in the To Prnt label. If it is not there, press **[F2]** to select the printer as a destination device.

Printing Display Memory

The following are various methods for printing text that is in display memory.

The PrtSc Key

To print using the **PrtSc** key:

(right) **Shift**-**PrtSc**

Performs a DOS print screen.

Available on all keyboards.

PrtSc

Prints the screen, except for the function key labels (if displayed). A form feed is optional (it is configured in the Printer Setup dialog box by the Auto Form Feed check box).

Choosing Print Screen from the File menu is the same as pressing **PrtSc**.

(Not available on an XT keyboard.)

Alt-**PrtSc**

Same as **PrtSc**; available on all keyboards.

(left) **Shift**-**PrtSc**

Same as **PrtSc**; available on all keyboards.

Ctrl-**PrtSc**

Toggles printing on. From then on, anything you type or display on the screen, excluding the function key labels, is sent to the printer. A form feed is not sent. Press **Ctrl**-**PrtSc** again to turn off printing. If you are in local mode (the Online check box in the General Setup dialog box is cleared) be sure the New Line check box in that dialog box is selected.

Reflection MSAVE Command

To send the contents of display memory to the printer:

1. Choose Command Line from the Tools menu (or press **Alt**-**F10**) to display the command line.
2. Type `MSAVE PRINTER` and press **Enter**. All data in display memory is printed.
3. Press **Esc** to leave the command line.

Character Translation and Printing

When you use any of the previous methods to print from display memory, the printer control code setting affects how certain characters are printed. When sending characters from display memory to a printer, the following rules apply:

Printer Control Code	Character Set	Action
DEC	8 bit (MCS) Control Codes	Pass through to printer Pass through to printer
IBM PRO and DJET500C	8 bit (MCS) Control Codes	Pass through to printer Pass through to printer
OTHER	All characters	Pass through to printer
Other Printers (TOSHIBA, etc.)	8 bit (MCS) Control Codes	Convert to IBM Pass through to printer

Printing to Disk

You can configure Reflection to route all printing to disk, using either the Printer Setup dialog box or Reflection's command language. This section covers using the Printer Setup dialog box; using command language is discussed in the Reflection *Command Language* manual. Reflection must be in local mode (clear the Online check box in the General Setup dialog box) to perform this operation.

The following steps send a screen dump to an ASCII text file:

1. Choose Printer from the Setup menu to display the Printer Setup dialog box.
2. In the Printer Interface list box, select *FILE*. This displays the Open File dialog box.
3. Enter a name in the File Name text box, then choose Open. Use *SCREEN.DSK* for this example.

4. Choose OK in the Printer Setup dialog box to activate the changes you have made.

The file SCREEN.DSK is now open. All printing is appended to SCREEN.DSK. If you save this setup to a configuration file, SCREEN.DSK is closed when you exit the program and re-opened when you run Reflection again.

5. Select a screen you want to print to disk. To print a Help dialog box, for instance, choose Topics from the Help menu, then press one of the Reflection print screen keystrokes, such as (Alt)-(PrtSc).

The screen is saved to SCREEN.DSK. By default, a form feed is appended to the end of the file, unless you clear the Auto Form Feed check box in the Printer Setup dialog box.

The print screen keystroke automatically closes a print file while the print screen is executed, then re-opens the file and is ready for more print-to-disk operations.

Subsequent printing is appended to the same file until you close the file. You also can't view or edit the file until it is closed. Do any one of the following:

- ▲ Go to the logging keys (press Logging from the main menu labels) and toggle To Prnt off (an asterisk in the label indicates that it is on).
- ▲ Choose Close Printer from the File menu.
- ▲ Enter a different name in the File Name text box in the Printer Setup dialog box.
- ▲ Set the Printer Interface list box to something other than *FILE*.
- ▲ Exit Reflection ((Alt)-(X) or (Alt)-(B)).
- ▲ Type CLOSE PRINTER on the command line ((Alt)-(F10)).

Printing a PC File

The methods described previously print the contents of a disk file, provided the file fits in Reflection's display memory: the file is read into display memory first, then printed using the method of your choice.

To print a PC disk file larger than display memory, use the Reflection PRINT command. Reflection bypasses display memory with this method. The To Prnt label does not need to be active.

1. Choose Command Line from the Tools menu (or press **(Alt)-(F10)**) to display the command line.
2. Type PRINT <filespec> and press **(Enter ↵)**.
3. Press **(Esc)** to leave the command line.

The entire file is sent directly to the printer, bypassing display memory. You can use DOS path names.

Reflection also allows you to send text or control characters to the printer when they are enclosed in quotes. For example ^L is the form feed control code. Use PRINT "**^L**" to force the printer to eject a page.

Control functions may be enclosed in quotes after the PRINT command to set printers that are controlled by special control functions, such as the LN03.

Printing Host Output

Printing host output is similar to printing in local mode, from display memory, or from a disk file. The major difference is that Reflection must be in remote mode. Verify that the Online check box in the General Setup dialog box is selected.

The following procedures assume that you are logged in to a host computer, and that you are familiar with the commands necessary to transfer data from the host to your PC. Review the "Transferring Files" section, which begins on page 367.

1. Press **(F10)** to get to the main menu labels.
2. Press **(F4)**, Logging.

Using Auto Print Options

Press **(F5)**, LOG. An asterisk means that logging is on. Enabling this mode immediately sends data from the keyboard or from datacomm to the printer (To Prnt) and/or a disk file (To Disk), one line at a time. Lines must be delimited by linefeeds.

To begin logging to the printer regardless of which destination devices are selected, press **(Ctrl)-(PrtSc)**. If the printer is not already selected, it is now. If a disk file is currently selected, it is closed and released. To stop printer logging, press **(Ctrl)-(PrtSc)** again.

See SET AUTO-PRINT in the *Reflection Command Language* manual.

Using Reflection Commands

Reflection command language provides another simple method of printing host output:

1. Choose Command Line from the Tools menu (or press **(Alt)-(F10)**) to display the command line.
2. Type OPEN PRINTER, and press **(Enter ↵)**.
3. Type LOG and press **(Enter ↵)**. All of the data received from the host is sent to the printer a line at a time and also displayed on the screen. Lines must be delimited by linefeeds.
4. Type CLOSE PRINTER and press **(Enter ↵)** to stop sending data to the printer.

Setting Lines Per Page

You can configure when form feeds should occur. If the file you are printing does not already contain form feeds, you can change the Lines Per Page text box in the Printer Setup dialog box to force a form feed after up to 999 lines.

Note: If the file contains form feeds, the printer executes a form feed after the number of lines specified and whenever a form feed is encountered in the file. ▲

Printing Wide Reports

Reflection is capable of printing lines as wide as your printer can handle. If you want to print lines wider than 80 columns, you must set the line width to match the capabilities of your printer. To specify a maximum line width for each of the print sizes (normal, compress, and expand) you must use the Reflection SET parameters listed below. The default for each one is 256.

```
SET LINE-WIDTH-COMPRESSED <40-9999>
```

```
SET LINE-WIDTH-EXPANDED <40-9999>
```

```
SET LINE-WIDTH-NORMAL <40-9999>
```

When Reflection receives a line of data that extends beyond column 80 or the right margin (whichever is greater), it automatically wraps around to the next line on the screen, and marks the new line as a *continuation* line. This happens regardless of the data source (keyboard, host, or disk). The continuation flag stays with the line in display memory until a line is inserted or deleted immediately above it. When lines are printed from display memory, continuation lines are sent to the printer as if they were part of the previous line, i.e., without a carriage return or linefeed.

Your host computer may be configured to limit the length of lines that it sends to the terminal to 80 characters. To configure the VAX to send 132-column lines, use the following:

```
SET TERM/WIDTH=132/NOWRAP
```

Another problem you may run into is a difference in the way your host computer and Reflection control line spacing and page ejects on the printer. The data going to the printer from Reflection generally must use only the ASCII carriage return, form feed, and linefeed characters to control vertical spacing.

Memory Management

When Reflection is run, it determines the amount of memory available in your PC. Included in the memory count required for Reflection are display memory, SHELL memory, graphics requirements, and so on. The rest of your PC's memory is available for running other programs.

Memory Allocation after Background

Reflection's background mode keeps Reflection in memory while you run other programs. If you have insufficient memory to use background mode, pressing the hot-key displays an error message. You may also find that you cannot load your PC application due to memory limitations.

You have several options for controlling how Reflection allocates PC memory:

- ▲ Use memory saving switches when loading Reflection
- ▲ Change the values in some Setup dialog boxes

If you find that these options do not provide enough memory, use state save, described on page 340, as an alternative to background mode.

There are a number of setup values that you cannot change once you've hot-keyed and Reflection has been placed in background mode. The memory requirements for Reflection are based on the settings specified at the time you first put Reflection into background mode:

- ▲ You cannot increase the size of Requested Display Memory in the Advanced Display Setup dialog box. When you run Reflection, you are allocated as much of the amount requested as possible. Compare that amount with what is shown in the Actual Display Memory field in the same dialog box. The requested amount can be saved to your configuration file.

- ▲ By default, no SHELL memory is allotted; set this memory on the command line before you hot-key. The amount that you request is saved to your configuration file, even if Reflection cannot allot quite that much.
- ▲ In Reflection 4, you can set # Bit Planes Saved in the ReGIS Setup dialog box to 4 and save that value to your configuration file. If you do not have enough memory for all 4 bit planes, Reflection will still run, only with fewer bit planes. Free up some memory, then run Reflection and set the number of bit planes again.

Reflection and DOS 5.0

Reflection can take advantage of any unallocated upper memory blocks (UMBs) made available when you run DOS 5.0 or above and HIMEM.SYS with memory management software such as EMM386.EXE. Using upper memory blocks allows Reflection to take up less space in conventional memory. See your DOS documentation for details on these utilities. If you do *not* want Reflection to use upper memory blocks, load Reflection with /NOHI.

The DOS Task Swapper keystroke (**Alt**-**Tab**) can be used with Reflection: Reflection is swapped in and out of memory along with the other applications in your Active Task List. Reflection does not, however, multitask. The Task Swapper keystroke is disregarded if a Reflection file transfer is in progress.

Saving Memory: Startup Switches

Use any combination of the switches below when loading Reflection to make Reflection use less memory. (See page 29 for a summary of all switches.)

/A: Assume CGA or Monochrome Card

If you are running Reflection 4 and you do not intend to run a graphics application, use /A to save about 24K of memory. This switch forces Reflection to assume a CGA or monochrome card is being used.

/E: Use Expanded Memory

If your PC has an expanded memory card and a LIM 3.20-compatible expanded memory driver, you can tell Reflection to load program and overlay code into expanded memory with /E. Overlays are retrieved more quickly from expanded memory than from disk.

/I: Inhibit Loading Font

This switch gives you the default EGA fonts (instead of DEC Technical, multinational, or dynamically redefinable character sets). It saves approximately 3.5K of memory in Reflection 2, and 1.5K of memory in Reflection 4.

/MEM: Determine Memory Usage

Not all of Reflection's code has to be present in memory at one time. This allows Reflection to offer increased power and functionality while using less memory. Segments of Reflection—such as file transfer and command language—are loaded on demand. While Reflection takes less memory, it also means that some operations may be slower because Reflection has to read these segments (called *overlays*) from disk.

The /MEM:<x> switch loads Reflection with a predetermined amount of memory for overlays. The choices are S (small), M (medium), ML (medium-large), or L (Large). The default is M. There is a tradeoff between performance and memory usage: the more memory you use, for example, the better the command language performance will be.

/MEM:S

The /MEM:S choice can affect Reflection's speed. For example, when Reflection is placed in background mode to run a command file, some commands are noticeably slower. The /MEM:S switch should save approximately 10K of memory over the /MEM:M option.

/MEM:M

This is the default choice.

/MEM:ML

The /MEM:ML choice allocates enough memory to improve performance and makes command files run faster.

/MEM:L

The /MEM:L option loads all program overlays into memory. With this choice, there is not enough memory to place Reflection in the background with the hot-key. If you are using Reflection from a floppy disk, /MEM:L is automatically used.

If you lose characters and are using disk caching software, you may need to use the /MEM:L switch. Poorly written disk cache programs may disable interrupts for long periods of time, causing receiver overruns (lost characters). If Reflection is loading overlays from disk, the disk cache program is active, and incoming characters may be lost. Reflection then prints a special character on the screen to let you know that an error has occurred.

/NOGR: No Graphics Support

If you are not using Reflection 4 to run host graphics, you can save approximately 27K of memory by starting with the /NOGR switch.

/S: Save/Restore Graphics Screen

The /S switch saves the foreground screen by caching it in an unused part of the EGA or VGA's memory. It reduces Reflection's memory requirements by about 1K.

Saving Memory: Setup Options

The setup options below can be used to save memory:

Macro Storage

Reducing Macro Storage in the General Setup dialog box can save 10K of memory in Reflection 4 and 6K in Reflection 2. Macro storage is set aside for user-defined VT420 macro commands. In Reflection 4, macro storage can also hold up to 26 ReGIS macrographs. Changing the value in Reflection 4 does not limit the number of possible macrographs, only the amount of memory for storing them.

In the Macro Storage text box, replace 10 with 5 in Reflection 4 to save 5K of memory, or with 0 if you are not using graphics or macros to save 10K. For Reflection 2, replace 6 with 0 if you are not using macros; this saves 6K of memory.

Downloadable Char Sets

In Reflection 4's ReGIS Setup dialog box, replace the default number of downloadable character sets (3) with 1. Each character set requires approximately 1K of memory, so this saves 2K of memory.

Display Memory

By default 10K is set aside for Reflection's display memory. Set the size of Requested Display Memory to 8 in the Advanced Display Setup dialog box to save 2K of memory.

State Save

State save (**Alt-B**) lets you exit Reflection temporarily without leaving it resident in memory. If you find that your memory requirements do not allow you to use the hot-key, you can use state save instead.

Pressing **Alt-B** to exit Reflection saves information about your Reflection session to a file. When you run Reflection again, the state save file is loaded if it is found. State save keeps all settings and parameters relating to the way you started Reflection, your host session, as well as any application you may be using from within Reflection. Because state save stores such detailed information about your hardware and session, a state file created on one machine should *never* be used on another machine.

For example, you can work in ALL-IN-1 on the host, use **Alt-B** to exit, and run a PC application that has extensive memory requirements. When you load Reflection again, you are back where you left off in ALL-IN-1.

See below for state save restrictions.

Open files

If you are writing to a file when you press **Alt-B** (for instance, you are using TRACE, CAPTURE, or LOG), those files are closed. If you want to use the trace file again, use the APPEND parameter when you re-open it.

When state save cannot be used

You cannot use the state save keystroke when a menu or dialog box is displayed, or when a command is being processed.

Startup switches

Most Reflection startup switches are not saved with **[Alt]-[B]**, allowing you to override specific switches when you load Reflection again. Normally, you should load Reflection with the same switches that were used when you last loaded Reflection and exited with **[Alt]-[B]**.

The exceptions to this rule are switches that specify hardware settings:

- ▲ /A (CGA or monochrome monitor)
- ▲ /I (IBM font)

If these switches are saved to a state file, they cannot be overridden—when you run Reflection again, the switches are in effect. Furthermore, if you use a state save file that does not contain these settings, you cannot use them at startup. Instead, delete the state file or run Reflection using /SD (see the following page).

DISCONNECT-ON-EXIT

If DISCONNECT-ON-EXIT is set to YES, it is disregarded when you use state save to exit Reflection: your session is not disconnected.

PATHWORKS

When a PATHWORKS user starts Reflection, the presence of a LAT driver is detected and Reflection's Connection Manager software is automatically loaded. On a "hard exit" (**[Alt]-[X]**), CONMGR.EXE and LATMGR.EXE are automatically removed from memory. On a state save, however, they must remain in memory so that active sessions are not lost. If you need to uninstall the two programs after a state save, remove them explicitly. The switch /U for uninstall works with both.

State Save Options

The following options can be used to save memory:

Filename

The default name for the state save file depends on which product you are using:

R2.EXE	R2STATE.STA
R4.EXE	R4STATE.STA

You can specify a different filename and/or location with a DOS SET command. See page 40.

Preserving the state file

By default, the state save file is deleted after running Reflection. Use the /SK switch to *keep* a state save file after it has been used. You can use this switch as part of a login procedure that includes loading a state save file. To avoid having the state save file overwritten by a new one, exit Reflection with **Alt-X**, not **Alt-B**.

Deleting the state file

If a state save file has been created, it is automatically used the next time Reflection is run. If you do *not* want to use the state save file, start Reflection with /SD.

The state save file is deleted (unless /SK is used). For example, if the system manager discontinues all sessions overnight, a state file with that session information is not useful.

If you find that you have inadvertently loaded an old state file, exit Reflection with **Alt-X** and start again.

Flow control

You can configure Reflection such that it transmits an XOFF ($^{DC}_3$) character to the host when you save Reflection's state. Enter `SET XOFF-ON-STATESAVE YES` on the command line. This prevents the host from transmitting any data to the PC while Reflection is not running. Do not change this value if you are using a network connection, such as the Reflection Network Series. Flow control is handled by the network software.

Command language

STSAVE and STLOAD are Reflection commands that allow you to load and save a state file, and STEXIT is the command language equivalent of an exit with save. See the Reflection *Command Language* manual for information.

Disk Operations

This chapter explains the various methods for moving data between display memory (in this case, the text mode screen, as opposed to the graphics mode screen), a host computer, and a disk file.

Some commands are used; see the *Reflection Command Language* manual for more information about them.

Specific instructions for the following operations are provided:

- ▲ Saving the contents of display memory to a disk file
- ▲ Reading the contents of a disk file into display memory
- ▲ Saving the output of a host computer to a disk file

Adding Text to Display Memory

Before experimenting with the operations in this chapter, add text to display memory. On the command line, type `DIR` and press **(Enter ↵)** to put some lines on the screen. Repeat this step until you have about 30 lines of text.

Alternatively, you can read text files from the PC's disk into display memory with the `TYPE` command:

1. Choose Command Line from the Tools menu (or press **(Alt)-(F10)**) to display the command line.
2. Enter `TYPE <filespec>` and press **(Enter ↵)**. The file specification must follow DOS filename syntax rules.

The entire file is scrolled into display memory one line at a time. To stop the screen's scrolling action, press **(ScrollLock)** or **(Ctrl)-(S)**; to resume, press **(ScrollLock)** again, or **(Ctrl)-(Q)**.

If the disk file is larger than display memory, Reflection deletes lines from the *top* of memory as it fills up; thus, only as much of the file that fits in display memory is present at one time. The size of display memory is configurable; see page 244.

Saving All of Display Memory to Disk

To save the data in display memory to a disk file, follow these steps:

1. Choose Command Line from the Tools menu (or press **(Alt)-(F10)**) to display the command line.
2. Type `MSAVE <filespec>` and press **(Enter ↵)**. Add the parameter `DELETE` if you want to overwrite a file that already exists. For example, type `MSAVE ACCT.DAT DELETE`.

All of display memory is saved to `ACCT.DAT` on the PC, regardless of where the cursor is or what destinations are selected for logging (disk, printer, or both).

Using Tabs in Output Disk Files

Reflection can replace spaces with ASCII tab characters when copying lines from display memory to a disk file.

The Change Spaces to Tabs check box in the ASCII File Transfer Options Setup dialog box controls how files are saved to disk from display memory, as well as how files are received from a host. Select this check box if you want to copy files to disk with tab control codes, not spaces. The default for this check box is cleared.

When Reflection is changing spaces to tabs, it assumes that tab stops are set as in the EDT editor, that is, at column 9 and at every eighth column thereafter. This results in a smaller file than if all spaces are written to disk, although the resulting file may not be compatible with your software application.

Sending Display Memory to the Host

This method allows you to transfer data directly from display memory to the host. You must be logged in to the host and have a host program running that can accept the file. To transmit the entire contents of display memory to the host:

1. Choose Command Line from the Tools menu (or press **(Alt)-(F10)**) to display the command line.
2. Type `MSAVE REMOTE` and press **(Enter ↵)**.

Saving Host Output to a Disk File

The following material assumes that the PC is in remote mode (the Online check box is selected in the General Setup dialog box) and logged in to a host computer. There are a number of methods for saving host output to a PC disk file:

- ▲ The LOG function saves host output to a local file (To Disk) and/or the PC printer (To Prnt) as it is being read, a line at a time, into display memory. To get to this label, press **[F10]** for the main menu labels, **[F4]**, Logging, and then **[F5]**, LOG. For the equivalent command, see “LOG” in the *Reflection Command Language* manual.
- ▲ Capture a text file from the host with the SET CAPTURE command.

Logging to Disk and/or Printer

Logging, also called *auto printing*, immediately sends data from the host to disk and/or to a printer.

When LOG is enabled (that is, when an asterisk appears in the function key label), data received into display memory is sent to a disk file, the printer, or both, one line at a time. Lines must be delimited by linefeeds.

Escape sequences can be sent from a host computer to enable and disable logging. See page 581. Also see SET AUTO-PRINT in the *Reflection Command Language* manual for the command language equivalent of this operation.



Logging

Label	Key	Function
To Disk	[F1]	Sends data to disk.
To Prnt*	[F2]	Selects the printer as a destination device for logging. This label only appears if a printer is specified in the Printer Setup dialog box.
LOG	[F5]	Logs data received from the host to a disk file and/or the printer

By default there is an asterisk in the To Prnt label, indicating that the printer is selected as a destination device. Be sure that Reflection is properly configured for your printer. Setting Printer Interface to *NONE* in the Printer Setup dialog box when no printer is available saves having to toggle the To Prnt label off.

To log the host output to disk:

1. Press **(F10)** to display the main menu labels
2. Press **(F4)**, Logging.

By default, the printer (To Prnt) is selected as the destination for the text.

3. To log to a disk file, press **(F2)** to toggle To Prnt off, and press **(F1)**, To Disk. The Open File dialog box appears.
4. In the File Name text box, enter the name of the file you want to log the host output to, then choose Open.

If you choose an existing file, Reflection gives you the option of appending the new host output to the end of the file, overwriting the old data, or cancelling to enter another filename.

5. Press **(F5)** to begin logging to disk.

The host output that appears in display memory is now also being sent to a disk file.

6. When you want to stop logging, press **(F5)** again to toggle LOG off, and press **(F1)** to toggle To Disk off.

Capturing Text Files from the Host

The SET CAPTURE command lets you capture all data, including control codes, coming from the host.

To capture a file from the host computer use the following steps (the current destination devices on the Logging function key labels are ignored):

1. Prepare to list the file on the host system.

For example, if you are using a VMS host, at the system prompt enter `TYPE <host filename>`. Do not complete the command with a carriage return yet, however.

2. Choose Command Line from the Tools menu (or press **Alt-F10**) to display the command line.
3. Type the following commands (press **Enter** after each command):

```
OPEN <PC filespec>
SET CAPTURE YES
```

4. Press **Esc** to exit the command line.
5. Press **Enter** to complete the TYPE command.
6. When the file has been completely listed, get back to Reflection's command line and enter the following commands to close the file:

```
CLOSE DISK
SET CAPTURE NO
```

The following example automates the steps above:

```
DISPLAY "What is the host filename? "
ACCEPT V1
DISPLAY "^M^J"
DISPLAY "What is the PC filename?"
ACCEPT V2
DISPLAY "^M^J"
TRANSMIT "TYPE $1"
OPEN $2
SET CAPTURE YES
TRANSMIT "^M"
WAIT FOR "$"
CLOSE DISK
SET CAPTURE NO
```

Note that the \$1 and \$2 are required: TYPE V1 would look for a file named V1, and OPEN V2 would open a file named V2. See the discussion of string variables under "\$" in the *Reflection Command Language* manual.

PC File Information

Use FILEINFO to learn more about your local PC files. You can find out if a file contains any characters outside of the ASCII set (characters with decimal values higher than 127 are binary files). Or, before transferring an ASCII file, you could use FILEINFO to find out if your file uses ^Z as an end of file indicator.

Different categories of information are shown, depending on whether the file is ASCII or binary.

Run FILEINFO from the DOS prompt. The syntax for this utility is as follows:

```
FILEINFO <filespec>
```

The parameter *<filespec>* can contain wildcards. The program lists the following:

RECSIZE

Specifies the maximum number of bytes per record (that is, the size of the largest record), including expanded tabs. Carriage return/linefeed are not included. On a binary file, the value of this field is listed as *NONE*.

ASC/BIN

Indicates whether a file is in ASCII or binary format. Record statistics (RECSIZE and #RECORDS) are not relevant for binary files.

TYPE

Displays *V* if records are of variable length, or *F* if records are of fixed length.

#RECORDS

Shows the total number of records in an ASCII file.

EOF (^Z)

Shows the record number where the ^Z end-of-file marker was found. If no ^Z is found, *NONE* is displayed in this column. Relevant only for ASCII files.

BYTES

Shows the size of the file, in bytes.

ARCV'D

Indicates whether the file has been backed up by a backup utility.

TABS

Indicates whether the file contains TAB (09 decimal) characters.

When you type `FILEINFO VAXDIR.RCL` at the DOS prompt, this is what you see:

FILENAME	EXT	-----	LOGICAL	RECORD	-----							
		RECSIZE	ASC/BIN	TYPE	#RECORDS	EOF(^Z)	BYTES	ARCV'D	TABS			
VAXDIR	RCL	82	ASCII	V	60	60	2366	NO	YES			

Display and Page Memory

Reflection saves the data it receives from datacomm in its display memory. You can configure the size of display memory to store many pages of text. The characters visible on the screen at any one time may be only a small part of the total display memory.

To see where the cursor is in display and page memory, set Status Line to *Indicator* (the default) in the Display Setup dialog box. If the Reflection function key labels are displayed, press **[F9]** to blank them and see the status line. Your cursor position is given on the left of the status line in the form `<n>(<nnn>,<nnn>)`. The first number is your page number in page memory, and the two numbers in parentheses are *row,column*. Remember that the cursor may be off-screen: you might not see it on your display.

Cursor Movement and Scrolling

The cursor is a display symbol that pinpoints your current working position on the PC screen. It usually takes the form of a blinking underline. You can scroll and view a different part of display or page memory, but this does not change the working position of your cursor.

When used alone, the arrow keys move the cursor one position up, down, left, or right on the screen. Pressing **[Ctrl]** with a cursor key causes the display to *scroll* in the specified direction. This allows you to see data that has previously scrolled off of the screen without affecting the cursor position.

When pressed with **[Ctrl]**, the cursor keys affect the display as follows:

- ▲ **[Ctrl]-[Home]** moves the beginning of display memory into view.
- ▲ **[Ctrl]-[↑]** scrolls your window up one line as it scrolls the display down.
- ▲ **[Ctrl]-[PgUp]** scrolls your window up one page.

- ▲ **Ctrl**-**←** scrolls your window 10 characters to the left, if the right margin is set beyond 80 and if the left margin is already scrolled horizontally off the screen. You can reconfigure the number of columns for each horizontal scroll operation by changing the value of SET COLUMNS-PER-SCROLL on the command line. See the *Reflection Command Language* manual.
- ▲ **Ctrl**-**→** scrolls your window 10 columns to the right, if the right margin is set beyond 80. You can reconfigure the number of columns for each horizontal scroll operation by changing the value of SET COLUMNS-PER-SCROLL on the command line. See the *Reflection Command Language* manual.
- ▲ **Ctrl**-**End** moves the end of display memory into view.
- ▲ **Ctrl**-**↓** scrolls your window down one line as it scrolls the display up.
- ▲ **Ctrl**-**PgDn** scrolls your window down one page.

Copy/Paste

You can copy text from the screen to an internal buffer called the *clipboard* and then send the text to the host. You could, for example, copy text from the terminal screen to a host application. You can perform copy and paste operations with either the keyboard or the mouse. Copy and paste work in text mode, but not in graphics mode.

Memory for the clipboard (where the cut text is temporarily stored before it is pasted) is taken out of display memory; one full screen is about 2K of memory.

Note that the Copy command on the Edit menu is dimmed until you select text to be copied, and the Paste command is dimmed until you copy text.

Mouse Operations

To use the mouse for copying and pasting text, perform these steps:

1. Press and hold the left mouse button and drag the mouse to highlight text on the terminal screen; the status line tells you you're in "select mode." You can also:
 - ▲ Hold down the **[Shift]** key and click the left mouse button to extend the selection.
 - ▲ Hold down the **[Ctrl]** key while dragging the mouse to select a rectangular area.
2. Once you have selected the text with the mouse you can:
 - ▲ Choose Copy from the Edit menu to copy the text to the clipboard.
 - ▲ Press **[PrtSc]** to print the selected text. If a disk file is open, the selected text is written to disk.
3. Choose Paste from the Edit menu to paste the text from the clipboard to the host.

Keyboard Operations

To use the keyboard for copying and pasting text, perform these steps:

1. Press **[Alt]-[C]**; the status line tells you're in "select mode."
2. Use **[Shift]-<arrow key>** to do a normal select, or **[Ctrl]-<arrow key>** to do a column select. You can use any arrow key, depending on the direction in which you want to select text.
3. Once you have selected the text you can:
 - ▲ Choose Copy from the Edit menu to copy the selected text to the clipboard.
 - ▲ Press **[PrtSc]** to print the selected text. If a disk file is open, the selected text is written to disk.
4. Press **[Esc]** to leave select mode.
5. Once you exit select mode, choose Paste from the Edit menu to paste the selected text from the clipboard to the host.

The two copy/paste keyboard functions are remappable. By default:

```
alt c = select-mode  
ctrl v = paste-clipboard
```

Using Reflection with Other Software

This chapter includes guidelines for running Reflection with other PC or host software.

Running Reflection with Novell

If you are on a Novell network, load your network software before starting Reflection: do not load NET<n> when Reflection is in the background.

DOS SHARE Users

Users who have DOS 4.0x and a hard disk with any partitions larger than 32 megabytes probably use SHARE. If you are a SHARE user, you must make the Reflection executable file *read-only*.

To make the executable program for Reflection 2 or Reflection 4 a read-only file, do the following:

```
ATTRIB +R R<n>.EXE
```

The read-only attribute is lost when a file is copied. Also, you cannot delete a read-only file until you change the attribute:

```
ATTRIB -R R<n>.EXE
```

Running Reflection with Windows

Running Reflection in the Microsoft Windows environment gives you the ability to use cut and paste to move text between Reflection and other applications. You can run several applications while working in Reflection under Windows.

To connect via LAT over PATHWORKS, load CONMGR.EXE and LATMGR.EXE before starting Windows. In a DOS environment, these programs are automatically loaded when LAT software is detected. In Windows, this capability is not supported.

You can run Microsoft Windows in one of the following modes:

- ▲ If you have an 80386 computer (or higher) with at least 2MB of memory you can run Reflection in 386 *enhanced mode* and have the benefit of Windows memory management capabilities.
- ▲ If you can't run in enhanced mode, run under Windows in *standard mode*.
- ▲ Microsoft Windows 3.0 supports *real mode* for running applications created for early (2.x) versions of Microsoft Windows.

See your Windows documentation for explanations of these modes.

Server Versions

A utility on the Reflection disks lets you load multiple copies of Reflection from the server into Windows and have it correctly report to the HOWMANY utility that only one copy of Reflection is running.

RCOUNTER.COM is intended for server versions of Reflection running under Windows. (It also works when loading a second copy of Reflection with the /O switch from the DOS prompt.) To use it, run it immediately before loading Windows by typing `RCOUNTER` at the DOS prompt.

Uninstall the utility with `RCOUNTER /U`. See page 23 for more information on server versions of Reflection.

The PIF

Two program information files (with the extension ".PIF") are included on the Reflection disks:

- ▲ R2.PIF and R2W.PIF are for Reflection 2.
- ▲ R4.PIF and R4W.PIF are for Reflection 4.

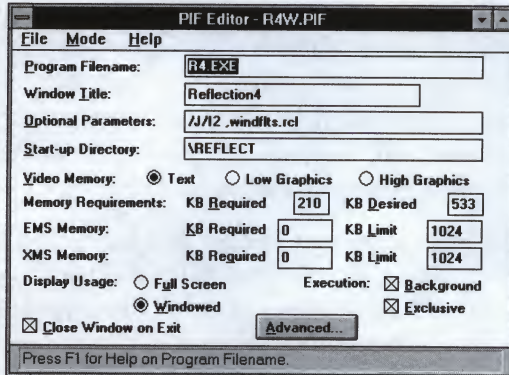
If you have been using earlier Reflection PIFs, update the program information for them with the filenames for the new PIFs. See the guidelines on page 360 for information on settings you must change in the PIF.

The Reflection PIFs are in Windows 3.1 format, but they can be read by earlier versions of Windows. Copy the appropriate PIF to your Windows directory and then run PIF Editor.

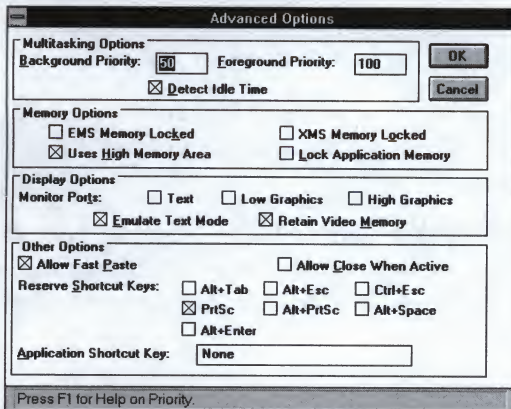
Most of the information necessary for running Reflection is in the provided PIF. You may need to change some fields, like the drive and subdirectory of the Reflection program. If you are running a pre-3.0 version of Windows, add /I to your Reflection start-up parameters.

Windows

The following figure shows the parameters set by R4W.PIF (Reflection 4 windowed) in the Windows 3.1 PIF Editor. The defaults for other Reflection products may vary slightly.



R4W.PIF for Windows



R4W.PIF for Windows (Advanced Options)

These guidelines are for Windows 3.0 and 3.1:

- ▲ If you copied an existing Reflection PIF to create a new PIF for R2 bit-mapped, you need to change the Window Title and add the /B132 startup switch to Optional parameters.
- ▲ The Display Usage options let you specify how Reflection starts in Windows. (These options are not available if you are running in real or standard mode.) Select Full Screen if you are configuring Reflection to start in graphics mode (always select Full Screen for R2B), or Windowed otherwise.
- ▲ The Execution options let you specify how Reflection runs with other applications. (These options are not available if you are running in real or standard mode.) Select Background if you want Reflection to continue to run when other applications are in the foreground. Select Exclusive if you want to suspend all other DOS (non-Windows) applications when Reflection is running. Windows applications (that is, applications that don't require PIFs) continue to run.
- ▲ Reflection's hot-key (Alt-Tab) and menu toggle are disabled by the PIF files to ensure compatibility with Windows. The RCL file WINDFLT.S.RCL, which is included in the PIF file's Optional Parameters, sets the following parameters:

```
SET HOT-KEY NONE
SET ALT-MENU-TOGGLE NO
```

- ▲ If you are using a PIF from a previous version of Reflection, you should replace it with one of the new PIFs distributed with Reflection version 5.0.
- ▲ If one of the PIFs distributed with this version of Reflection is edited with a version of PIF Editor prior to 3.0, the fields specific to Windows 3.0 or 3.1 will return to their default values.
- ▲ When running Reflection for DOS under a PIF in Windows, you can force Reflection to run faster by making the Windows File Manager ignore Reflection's file activity. To do this, add the following line to the [386Enh] section in your SYSTEM.INI file:

```
FileSysChange=no
```

This change only applies to running non-Windows applications: it should not affect the performance of true Windows applications.

- ▲ You may have receiver overruns (lost data that shows up as a triangle symbol on your screen) if you use COM3 or COM4 on a non-Micro Channel AT-class machine. Windows is unaware of the IRQ and address reported by these cards. Use the steps below to solve this:

1. Run COM34WIN.EXE (provided with Reflection) before running Windows. You may want to add it to your AUTOEXEC.BAT file.
2. Add the following lines to the [386Enh] section of your SYSTEM.INI file. This file should be in the Windows directory.

```
COM3IRQ=<irq number>
COM3BASE=3E8H
COM4IRQ=<irq number>
COM4BASE=2E8H
```

The COM3BASE and COM4BASE lines are correct for all COM3 and COM4 cards. Use COM3IRQ=10 and COM4IRQ=11 to match the default IRQs for COM3 and COM4. If you use a different IRQ for COM3 or COM4—for example, you have selected COM3-IR4 as the Connection Type in Reflection's Datacomm Setup dialog box—use that IRQ to complete this section in SYSTEM.INI. See page 83 for IRQ configuration information.

Note: On Micro Channel PS/2 machines, neither of these steps is necessary. ▲

Copying to the Clipboard

In Windows, **[Alt]-[PrtSc]** and **[PrtSc]** are both used for copying the screen image to the Clipboard. Reflection “takes over” one of these keystrokes—**[PrtSc]**—for its print screen operations.

Use **[Alt]-[PrtSc]** for standard Windows Clipboard operations. You can only cut and paste text from the Reflection screen, not graphics.

DESQview

DESQview is a PC program that lets you run a number of applications simultaneously, each in its own window. Use the guidelines below to configure DESQview for Reflection.

Go to “Open a Window” and select “Add a Program”:

- ▲ In Memory size (in K), enter 200 for either Reflection 2 or Reflection 4. (This is generous; experiment with a lower setting if you are short on RAM.)
- ▲ The options below should be set as follows:

Option	Setting
Writes directly to screen	Yes
Virtualize Text/Graphics	Yes
Window Position—Maximum height	27 (Advanced Configuration)
Close on exit	Yes (Advanced Configuration)
Allow Close Window command	Yes (Advanced Configuration)
Can be swapped out	No (Advanced Configuration)

If you have a serial connection to the host, set “Uses serial ports” to Yes. DESQview/X users should set “Virtualize Text/Graphics” to No.

If you have QEMM expanded memory manager installed, Reflection works in a small window as well as at full screen. Without QEMM, only full screen mode is available. Graphics is not supported in windowed mode.

Once all of this program information is saved, these settings are used when you run Reflection from within DESQview.

DOS Command Line Editors

Reflection can work with certain DOS command line editors once it is loaded using the /Y switch. Type R2 /Y or R4 /Y at the DOS prompt to make Reflection compatible with the programs CED, DOSEDIT, and NDE.

You do not need to use this switch if you are using DOS 5.0's built-in command line editor (DOSKEY.COM).

Using EDT on a VAX

To use the EDT editor you will probably want to map your keyboard to make it operate more like a VT keyboard. Run KEYCOMP, the keyboard mapping compiler, with the following switch (you can indicate the name of a configuration file to save the mapping to, or wait until you are prompted):

```
C:> KEYCOMP /S [<configuration filename>]
```

You are prompted through the process of selecting your keyboard type and adding mapping information to a configuration file.

On an Enhanced keyboard, the keystrokes for EDT functions are then as follows (use the numeric keypad):

EDT Function	Enhanced Keystroke
Gold	F1
Help	F2
Help index	F1, F2
Find next	F3
Find	F1, F3
Delete line	F4
Und line	F1, F4
Page	7
Command	F1, 7
Sect	8
Fill	F1, 8
Append	9
Replace	F1, 9
Forward	4
Bottom	F1, 4
Reverse	5

Top	F1, 5
Cut	6
Paste	F1, 6
Word	1
Change case	F1, 1
Eol	2
Del Eol	F1, 2
Char	3
Specins	F1, 3
Line	0
Open line	F1, 0
Select	.
Reset	F1, .
Del word	+
Und word	F1, +
Del char	Shift-+
Und char	F1, Shift-+
Enter	Enter
Subs	F1, Enter
Beginning of line	Backspace
Compute tab level	Ctrl-A
Decrease tab level	Ctrl-D
Increase tab level	Ctrl-E
Define key	Ctrl-K
Adjust tabs	Ctrl-T
Refresh screen	Ctrl-W
Return to line mode	Ctrl-Z

Using OS/2

Reflection should be able to run with OS/2 version 2.0 and above without any setup changes to the installation of OS/2, as long as you are using standard IRQ assignments (see the tables on page 82).

You can use COM3 through COM8 on an IBM Micro Channel PS/2 machine without doing any special configuration. But for other machines, you need to make the OS/2 COM drivers aware of the IRQ and address that COM3 and COM4 are using.

In your CONFIG.SYS file (the one that OS/2 uses when you boot your machine), include the COM port number (3 or 4), base address, and IRQ number parameters next to the COM.SYS and VCOM.SYS filenames. For example:

```
DEVICE=C:\OS2\COM.SYS (3,3E8,4) (4,2E8,3)
DEVICE=C:\OS2\MDOS\VCOM.SYS (3,3E8,4) (4,2E8,3)
```

The base addresses should be the same for all COM3 and COM4 cards: COM3 should always be 3E8 and COM4 should always be 2E8, as in this example. The IRQ values of 4 for COM3 and 3 for COM4 match the default IRQs that Reflection uses for these COM ports.

Parameters for COM1 and COM2 do not need to be included, unless you are using nonstandard IRQs. Many COM3 and COM4 cards use other IRQs, and Reflection can be configured to use these. The values entered in CONFIG.SYS must match those of the COM card and Reflection's setup.

OS/2 must end up with sequentially numbered COM ports. For example, if a COM2 port is not installed, but COM port 3 or 4 is installed, start numbering using (<n>, ...) in the DEVICE lines in CONFIG.SYS. This means that if there is no real COM2, the port at base address 3E8 and IRQ 4 will be called COM2 as far as OS/2 is concerned. The COM numbers would then change, making the example above now look like this:

```
DEVICE=C:\OS2\COM.SYS (2,3E8,4) (3,2E8,3)
DEVICE=C:\OS2\MDOS\VCOM.SYS (2,3E8,4) (3,2E8,3)
```

Reflection still needs to have access to the correct port and IRQ, so in this case, what OS/2 is referring to as COM2 is set up as COM3 in Reflection, and OS/2's COM3 is configured as COM4 in Reflection.

Using OS/2 with a 16550 Serial Port

If you are running under OS/2 and have a 16550 serial port installed:

- ▲ Include the following line in your AUTOEXEC.BAT file to enable 16550 support:

```
MODE COM1:,,,BUFFER=ON
```

This tells OS/2 that a 16550 serial port is present. This is a change from OS/2 version 2.0, where the MODE entry was in your CONFIG.SYS file.

- ▲ The COMCHECK program (explained on page 83) will report that no 16550 serial port is installed, though it is used. This is because OS/2 virtualizes, or simulates, the serial port and controls all buffering on its own.

Transferring Files

File transfer protocols provide a means of transferring a file from one computer to another over a communications link. Reflection supports file transfers using any one of several distinct file transfer protocols.

Reflection file transfers can be performed using the File Transfer dialog box, or with Reflection command language. The emphasis in this section is on transferring files using the dialog box. The *Reflection Command Language* manual covers file transfers with command language; also see page 380 in this manual.

Use the chapters in this section as follows:

- Chapter 26* For an overview of file transfers, including discussion of the various file transfer protocols and some tips on using the File Transfer dialog box.
- Chapter 27–30* For information concerning the WRQ protocol, including uploading host programs, using the protocol in specific host environments, and how to transfer files.
- Chapter 31–35* For information concerning how to transfer files using Reflection's other protocols: Kermit, Zmodem, Xmodem, FTP, and OLD-WRQ.

For file transfer troubleshooting information, see "Troubleshooting" starting on page 475.

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File Transfer Overview

A *file transfer protocol* is a standardized procedure for sending a file from one computer across a communications link to another computer. A protocol describes the procedure for transferring files; it specifies:

- ▲ How file transfer packets are structured
- ▲ How the receipt of a packet is acknowledged
- ▲ How packets are checked for possible communications errors
- ▲ How errors are handled when they occur

Programs are written to *implement* protocols for different computer platforms. If two computers, such as a personal computer and a host computer, can perform the same protocol, then they have a common method for transferring files between them.

Reflection's file transfer protocols and their requirements are introduced in this chapter. Tips on using the File Transfer dialog box and file transfer commands are also discussed.

Walker Richer & Quinn Protocols

Reflection offers two Walker Richer & Quinn proprietary file transfer protocols, WRQ and OLD-WRQ. Both personal computer and host computer implementations of these protocols are provided, making it possible to transfer files between a PC and the following host computers:

- ▲ VMS systems
- ▲ UNIX-based systems

Prior to version 4.0, Reflection used the file transfer protocol that is now referred to as the *OLD-WRQ* protocol. This older protocol continues to be supported in newer versions of Reflection. To use this protocol, the appropriate OLD-WRQ host program must already be available on your host computer (see the following table for default program names).

The WRQ file transfer protocol was introduced with version 4.0 of Reflection. To use the WRQ protocol, you must have a copy of Reflection that is version 4.0 or above, and you must install the appropriate WRQ protocol host program on your host computer; the following table gives default program names:

Host Computer	OLD-WRQ Host Program	WRQ Host Program
VMS	VAXLINK	VAXLINK2
UNIX	unixlink	unxlink2

When you use the Setup program to do a complete Reflection installation, current versions of the WRQ host programs are copied to the Reflection directory. For information on installing a host program to a host computer, see "Uploading a WRQ Host Program" beginning on page 381.

With any version of Reflection 4.0 or above, it is recommended that you use the WRQ file transfer protocol. It has advantages over both the OLD-WRQ protocol and most public domain protocols:

- ▲ Wildcard transfers are supported in both directions.
- ▲ Data compression techniques produce faster transfers.
- ▲ CRC-CCITT error checking ensures error-free transmission.
- ▲ The protocol works in a similar fashion across VMS and UNIX-based systems.
- ▲ The protocol offers a transfer method that downloads a host-specific file to the PC with host file parameters included. This information can be used to rebuild the original file on the same, or a similar, host computer.
- ▲ ASCII files can be sent from the PC to a VMS print queue or batch queue.

The WRQ protocol supports additional file transfer options when you use Reflection command language; see the SEND and RECEIVE commands in the Reflection *Command Language* manual for details.

If you are using Reflection Network Series software (or LAT software from Digital), the WRQ protocol provides *fast file transfer* for LAT connections to VMS systems. Reflection's fast file transfer goes at speeds comparable to the Internet File Transfer Protocol (FTP).

The OLD-WRQ protocol may be useful in the following situations:

- ▲ To transfer files with a host computer that only has support for the OLD-WRQ protocol.
- ▲ To support older procedures that reference VAXLINK or unixlink. (These procedures should be updated to take advantage of the newer protocol whenever possible.)
- ▲ To support file transfer with pre-4.0 versions of Reflection.

For information on how to do file transfers using the WRQ protocol, see page 391. For the OLD-WRQ protocol, see page 469.

Public Domain Protocols

Reflection also provides personal computer implementations of three public domain file transfer protocols:

- ▲ Kermit
- ▲ Zmodem
- ▲ Xmodem

To use one of the protocols, you must be connected with an information service, host computer, or PC that also provides the protocol. These protocols are widely used by bulletin board services.

For information on how to do file transfers using these protocols, see the following chapters:

- ▲ “File Transfers Using Kermit” starting on page 421
- ▲ “File Transfers Using Zmodem” starting on page 431
- ▲ “File Transfers Using Xmodem” starting on page 441

FTP—The Internet File Transfer Protocol

The Internet File Transfer Protocol (FTP) runs over the widely used TCP/IP network. This protocol pairs an FTP client with an FTP server. Reflection provides an implementation of the FTP client. Reflection FTP transfers require the following:

- ▲ The PC and the host must be on a TCP/IP network.
- ▲ The PC must load the Telnet support that comes with Reflection or with a Reflection Network Series product (the Telnet Connection, the TCP Connection, or the 3000 Connection).
- ▲ The host must be running an FTP server.

For information on how to use Reflection's FTP, see "File Transfers Using FTP" beginning on page 449.

Using Reflection's File Transfer Dialog Box

Choose Transfer from the File menu to display the File Transfer dialog box; for a general introduction to this dialog box, see page 183. Additional information on working with local files and host files follows.

WRQ File Transfer

Local File Name		Transfer Method	
		☒ Ascii ☐ Binary ☐ Image	
Showing C:\REFLECT		If File Exists	
Files		☐ Append ☒ Cancel ☐ Overwrite ☐ Purge	
DECFONT.FT			
Host File Name		Host Record Size	
		512	
Send To Host		Done	
Receive From Host		Transfer Setup...	

WRQ File Transfer Dialog Box

Local Files

The Local File Name text box and Files list box in the File Transfer dialog box are used to specify local file names when transferring files. You can enter a file name or wildcard pattern in the Local File Name text box, or select a file from the Files list box.

The field labeled “Showing” indicates Reflection’s current drive and directory. The wildcard pattern (or file name) included in the field indicates the subset of files from the current directory displayed in the Files list box.

In the preceding figure, “Showing C:\REFLECT*.*” indicates that Reflection’s current directory is C:\REFLECT. The *.* pattern indicates that *all* files in C:\REFLECT are currently displayed in the Files list box.

You can use the Local File Name text box, Showing field, and Files list box in the following ways:

To change Reflection’s current drive:

- ▲ Enter a drive specification in the Local File Name text box. To make A: the current drive, type A: and press **Enter** or **Tab**. The Showing field will be updated accordingly.

To change Reflection’s current directory:

- ▲ Enter a path specification in the Local File Name text box. To make \TEMP the current directory, type \TEMP and press **Enter** or **Tab**. Include drive information if the directory is on a different drive; for example, A:\FILES. The Showing field will be updated accordingly.

To change the selection of files shown in Files list box:

- ▲ Enter a wildcard pattern in the Local File Name text box. To show files with the extension .TXT, type *.TXT and press **Enter** or **Tab**. The Showing field will be updated accordingly.

To specify a PC file or files when Sending to Host:

- ▲ Type the file name in the Local File Name text box, if the file is in the current directory:

FILE10.TXT

- ▲ If the file is *not* in the current directory, type the path and file name in the Local File Name text box:

\FILES\FILE11.TXT

- ▲ If the file is *not* on the current drive, include the drive letter in the file specification:

A:\FILE12.TXT

- ▲ If the file transfer protocol supports wildcard transfers to the host, use the DOS asterisk (*) and question mark (?) wildcard characters to transfer multiple files; include drive and path information if the files are not in the current directory:

FILE*.TXT

\FILES*.TXT

A:*.*

- ▲ Select a file from the Files list box—when selected, the file's name appears in the Local File Name text box.

To specify a PC file name or directory when Receiving from Host:

- ▲ Leave the Local File Name text box blank if you want the PC file to reside in the current directory and have the same name as the host file. This also applies to wildcard transfers from the host if the file transfer protocol supports them.
- ▲ Enter a PC file name when you are transferring a single host file that you want to rename on the PC. The file will reside in the current directory.
- ▲ *WRQ, Zmodem, and FTP protocols only.* Enter a PC drive and/or directory to specify a location for your PC file other than the current drive and directory. This also applies to wildcard transfers from the host if the file transfer protocol supports them.

Host Files

The Host File Name text box is used to specify host file names when transferring files. You can use the Host File Name text box in the following ways:

To specify a host file, host group, or host directory when Sending to the Host:

- ▲ Leave the Host File Name text box blank if you want the host file to reside in the current group or directory and have the same name as the PC file. This also applies to wildcard transfers to the host if the file transfer protocol supports them.
- ▲ *WRQ, Kermit, Zmodem, FTP, and OLD-WRQ protocols only.* Enter a host file name when you are transferring a single PC file that you want to rename on the host. The file will reside in the current group or directory.
- ▲ *WRQ protocol only.* Enter a host group or directory to specify a location for your host file other than the current group or directory. This also applies to wildcard transfers to the host if the file transfer protocol supports them.

To specify a host file or files when Receiving from the Host:

- ▲ Type a valid host file name in the Host File Name text box, if the file is in the current group or directory.
- ▲ If the file transfer protocol supports wildcard transfers from the host, use the wildcard characters required by your host to transfer multiple files.
- ▲ *WRQ, Kermit (server mode), and Zmodem protocols only.* If the file is not in the current group or directory, qualify the host file name as required for your host. This also applies to wildcard transfers from the host if the file transfer protocol supports them.

For information on using the Host File Name text box with specific hosts, see:

- ▲ “WRQ Transfers with VMS Systems” starting on page 399
- ▲ “WRQ Transfers with UNIX-Based Systems” starting on page 415

Reflection Command Language

See the *Reflection Command Language* manual for information on the following protocol-specific file transfer commands:

Protocol	Commands
WRQ	SEND, RECEIVE, SERVER, and FINISH
Kermit	KSEND, KRECEIVE, KGET, KFINISH, and KBYE
Zmodem	ZSEND and ZRECEIVE
Xmodem	XSEND and XRECEIVE
FTP	FSEND, FRECEIVE, FCD, FDIR, FGET, FLS, FMGET, FMPUT, FPUT
OLD-WRQ	SEND (old) and RECEIVE (old)

To send an ASCII file to another system without the aid of a file transfer protocol, see the TRANSMIT command in the *Reflection Command Language* manual. To use this method of file transfer, there must be a program on the other system that can receive and save the transmitted file. No error-checking is provided with this method.

Uploading a WRQ Host Program

To transfer files using the WRQ protocol, the WRQ host program must be on your host computer. One copy of the WRQ host program can be used by all Reflection users as long as it resides in an area where all users can access it. Check with your system administrator to see whether the program has been installed at your site. The default program name for each host environment is:

Host Computer	WRQ Host Program
VMS	VAXLINK2
UNIX	unxlink2

New versions of WRQ host programs are provided with each release of Reflection. It is recommended that you update your host program whenever a newer version becomes available to you. New versions of the WRQ host program will work with all versions of Reflection that support the WRQ protocol (version 4.0 and above).

If you need to upload a host program, see the procedure for your host environment:

- ▲ VMS host program; see page 381
- ▲ UNIX host program; see page 384

“Checking Existing Host Programs” beginning on page 386 explains how to check for an existing host program and how to determine a host program version number.

The VMS Host Program

When you do a complete installation of Reflection, the following files are copied to your Reflection directory. Before you begin the upload procedure, check for these files in the directory where Reflection is installed:

VAXLINK2.EXE	The WRQ protocol host program for VAX/VMS systems.
ALPHALK2.EXE	The WRQ protocol host program for Alpha VMS systems.

UPLOADVX.RCL

The Reflection command language script that uploads the WRQ host program to your system. The script determines what kind of VMS system you are logged on to, and uploads the appropriate host program:

- ▲ If you are logged on to a VAX/VMS system, the script uploads VAXLINK2.EXE to the host.
- ▲ If you are logged on to an Alpha VMS system, the script uploads ALPHALK2.EXE to the host.

WRQUPLOA.MAR An auxiliary file required for upload.

If these files are not present, run the Setup program from your Reflection disks and choose the "Install ALL FILES" option.

Note: You must have VAX/VMS 5.x or above to use VAXLINK2, the host program for the WRQ protocol. If you are using a pre-5.x version of VAX/VMS, use the OLD-WRQ protocol from Walker Richer & Quinn. If you need a copy of the OLD-WRQ host program, VAXLINK, contact WRQ's technical support. ▲

Upload Procedure for VMS Systems

To upload the WRQ host program to a VMS system:

1. Start Reflection; confirm that Parity in the Datacomm Setup dialog box is set to NONE or 0's.
2. Establish a connection to the VMS system. You can upload VAXLINK2 over a direct serial, modem, or network* connection.
3. Log in to the VMS system; change to the VAXLINK2 destination directory.
4. Choose Open from the File menu to display the Open File dialog box.
5. If files in your Reflection directory are displayed in the Files list box, continue to the next step. To display the Reflection directory in the Files list box, type the drive and directory where Reflection is installed in the File Name text box and press Enter ↵.

* If you upload over a network, you may have trouble if the network does not recognize flow control. If the upload is unsuccessful, try setting a Character Transmit or Line Transmit delay in the Advanced Datacomm Setup dialog box.

6. Select *Command* from the List Files of Type option buttons—notice that the label of the command button changes to Run.
7. In the Files list box, select the file UPLOADVX.RCL.
8. Choose Run to execute UPLOADVX.RCL.
9. The following steps describe the execution of the script UPLOADVX.RCL:

- a) To proceed with the upload, press to accept the default (YES). To exit the upload procedure, type NO and press .
- b) At the next prompt, press to answer NO if you do not have VAXLINK2 or VAXLINK on your host. WRQUPLOA.MAR (a Kermit utility) will be copied to your host, compiled, and linked.

If you have VAXLINK2 or VAXLINK on your host, type YES at the prompt and press . The questions that follow ask which host program is available, and whether you current Host Startup Sequence is correct, or needs to be modified.

- c) The Transfer in Progress dialog box will open and provide information on the progress of the upload. VAXLINK2.EXE is uploaded using WRQUPLOA or an existing host program, depending upon your previous responses.

When the upload procedure is complete, the Transfer in Progress dialog box closes and you are notified whether the upload has succeeded.

10. If you want to cancel the upload, choose Cancel in the Transfer in Progress dialog box.

If the upload was successful, you will find VAXLINK2.EXE in your current VMS directory.

The level of VMS file protection for VAXLINK2.EXE determines who will be able to execute the program. For widest access, assign *World:Execute* privileges to VAXLINK2.EXE at the DCL prompt:

```
SET PROTECTION = WORLD:E VAXLINK2.EXE
```

The UNIX Host Program

When you do a complete installation of Reflection, the following files are copied to your Reflection directory. Before you begin the upload procedure, check for these files in the directory where Reflection is installed:

UNXLINK2.C	"C" source code for WRQ protocol host program.
UNXXFER.C	"C" source code for WRQ protocol host program.
UPLOADUX.RCL	The Reflection command language script that: ▲ Uploads the WRQ host program source code to your UNIX system. ▲ Compiles the source code to create unxlink2—a "C" compiler on the UNIX host is required for this procedure. ▲ Configures Reflection for WRQ file transfers.
WRQKERM.C	"C" source code for receive-only Kermit protocol host program.

If these files are not present, run the Setup program from your Reflection disks and choose the "Install ALL FILES" option.

Upload Procedure for UNIX Systems

To upload the WRQ host program to a UNIX system:

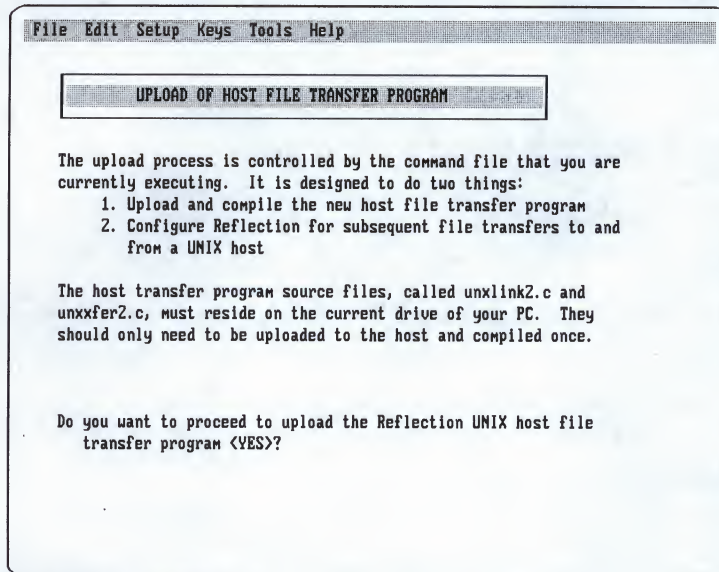
1. Start Reflection.
2. Establish a connection to the UNIX system. You can upload UNXLINK2.C and UNXXFER2.C over a direct serial, modem, or network* connection.
3. Log in to the UNIX host; change to the directory where you want unxlink2 to reside.
4. Choose Open from the File menu to display the Open File dialog box.

* If you upload over a network, you may have trouble if the network does not recognize flow control. If the upload is unsuccessful, try setting a Character Transmit or Line Transmit delay in the Advanced Datacomm Setup dialog box.

5. If files in your Reflection directory are displayed in the Files list box, continue to the next step.

To display the Reflection directory in the Files list box, type the drive and directory where Reflection is installed in the File Name text box and press **[Enter ↵]**.

6. Select *Command* from the List Files of Type option buttons—notice that the label of the command button changes to Run.
7. In the Files list box, select the file UPLOADUX.RCL.
8. Choose Run to execute UPLOADUX.RCL. The following screen is displayed:



First Screen of UPLOADUX.RCL

9. Each step in the upload procedure is fully explained on your screen. The following user input is requested:
 - ▲ Indicate whether or not you are using UNIX System 5.
 - ▲ Indicate whether you want to save settings for WRQ file transfers to the default configuration file (R2.CFG or R4.CFG) or to another file name.
10. If you want to cancel the upload, choose Cancel in the Transfer in Progress dialog box.

If the procedure was successful, you will find `unxlink2` in your current directory on the host. When you use the WRQ protocol to transfer files with your UNIX system, load Reflection with the configuration file to which you saved the file transfer settings.

The "access permission" assigned to `unxlink2` determines who will be able to execute the program. For widest access, assign *execute* access for *user*, *group*, and *other* at the UNIX prompt:

```
chmod ugo + x unxlink2
```

If the entire upload and configuration procedure was not completed, the procedure on page 391 describes how to configure Reflection for these transfers.

Checking Existing Host Programs

Use the methods given to:

- ▲ Check for a WRQ file transfer program on your host.
- ▲ Check the version number of a WRQ file transfer program on your host.

For VMS and UNIX systems, procedures for uploading a WRQ file transfer program using a host Kermit program (if available) are provided.

VMS Host Programs

Use the following methods if your host is a VMS system.

Checking for VAXLINK or VAXLINK2

Use the following methods to check for VAXLINK or VAXLINK2:

- ▲ Enter the following at the DCL prompt to see whether VAXLINK or VAXLINK2 has been defined as a logical:

```
SHOW LOGICAL VAXLINK*
```

The output for an existing logical will look something like this:

```
"VAXLINK2" = "<path>:VAXLINK2.EXE" (LNM$PROCESS_TABLE)
```

The `<path>` indicates the location of the existing host program.

- ▲ To see whether VAXLINK or VAXLINK2 has been defined as a foreign command, enter:

```
SHOW SYMBOL VAXLINK*
```

The output will look something like this:

```
VAXLINK2 == "$<path>:VAXLINK2.EXE"
```

- ▲ At the DCL prompt, use the command shown below to list files on your VMS system named VAXLINK or VAXLINK2. The output from this command can take several minutes to complete; to abort the command press **Ctrl-C**.

```
DIR <device>:[<directory>]VAXLINK*.EXE;*
```

The rights associated with your logon determine what directories you will be able to view. The host wildcard character (*) is used to display all files with names that begin "VAXLINK-" in the directories you specify.

The output displays the complete file name, along with the device and directory (or an equivalent logical name) where the file resides. For example, the output can look like this:

```
Directory HOST$ROOT:[EXE]
```

```
VAXLINK2.EXE;1
```

This output indicates that VAXLINK2 is installed in the EXE directory of the location signified by the logical, HOST\$ROOT.

Checking the Version of VAXLINK2

To determine the version number of the VAXLINK2.EXE program, set up a VMS foreign command to execute the program. See "Defining VMS Logicals and Foreign Commands" beginning on page 409 for details.

Use the foreign command you have defined to pass VAXLINK2.EXE the version number parameter, V. For example, if your foreign command is VAXLINK2, type the following at the DCL prompt:

```
VAXLINK2 V
```

Uploading VAXLINK2 with KERMIT-32

To upload VAXLINK2 using VMS KERMIT-32:

1. Make sure you have VMS KERMIT-32 on your host; it must be version 3.3.011 or above (the version number is displayed when you start the program).
2. Start the host program (this is done typically by typing `KERMIT` at the DCL prompt).
3. At the KERMIT-32 host prompt, type the following two commands, pressing `(Enter ↵)` after each one:

```
SET FILE TYPE FIXED
RECEIVE
```

4. Enter the following command on the Reflection command line and press `(Enter ↵)`:

```
KSEND VAXLINK2.EXE BINARY
```

The Transfer in Progress dialog box will display information concerning the progress of the upload.

5. When the transfer completes, exit the KERMIT-32 program by typing `QUIT`.

If the upload is successful, you will find a file called VAXLINK2 in your current directory on the VMS system.

UNIX Host Programs

Checking for unixlink or unxlink2

At the UNIX prompt, use the commands shown below to list all files on your UNIX host named unixlink or unxlink2. The output from these commands can take several minutes to complete; to abort a command send an interrupt to your host (use the interrupt keystroke defined for your system).

```
find / -name unixlink -print
find / -name unxlink2 -print
```

The output displays the file name, along with the directory where the file is installed. For example, the output from the second command can look like this:

```
/usr/local/bin/unxlink2
```

This output indicates that unxlink2 is installed in the /usr/local/bin directory.

Checking the Version of unxlink2

To determine the version number of unxlink2, type the following at the host prompt:

```
unxlink2 -v
```

Uploading Source Files with Kermit

To upload unxlink2 source file using Kermit:

1. Make sure you have Kermit on your host.
2. Start the host program (this is done typically by typing `kermit` at the UNIX prompt).
3. At the Kermit prompt, type:

```
server
```
4. Enter the following command on the Reflection command line to send the files UNXLINK2.C and UNXXFER2.C to the host:

```
KSEND unx*.c
```

Naming is case sensitive on UNIX hosts, therefore the wildcard file name must be entered in lowercase so that the resulting UNIX files are named in lowercase.

5. When the transfer is complete, exit the Kermit server mode by typing `KFINISH` on the Reflection command line.
6. Exit Kermit by typing `exit` at the Kermit prompt.

The Transfer in Progress dialog box will display information concerning the progress of each upload. If the uploads are successful, you will find the two source files in your current directory on the UNIX host. Compile these two files to create the host program `unxlink2` as explained next.

Compiling `unxlink2`

After transferring the two source files, `unxlink2.c` and `unxxfer2.c`, to the host, the next step is to compile them using UNIX commands. A "C" compiler on the UNIX host is required for this procedure. The compiler command you use depends upon what version of the UNIX operating system you're running:

- ▲ If you're using UNIX System 5, enter this command at the host prompt:

```
cc -DSYSTEM5 -o unxlink2 unxlink2.c unxxfer2.c
```

Since many UNIX systems (including SCO/Xenix) are based on System 5, use this command if you do not know what version of UNIX you have.

- ▲ For all other UNIX systems, use this command:

```
cc -o unxlink2 unxlink2.c unxxfer2.c
```

File Transfers

Using the WRQ Protocol

To transfer files using the WRQ protocol:

- ▲ The WRQ protocol host program must be installed on your host computer; see “Uploading a WRQ Host Program” beginning on page 381.
- ▲ Reflection must be configured to do WRQ protocol transfers with your host computer.

Using the WRQ Protocol with Specific Hosts

This chapter provides general information on using the WRQ protocol. For additional information on using the protocol in specific host environments, see:

- ▲ “WRQ Transfers with VMS Systems” starting on page 399
- ▲ “WRQ Transfers with UNIX-Based Systems” starting on page 415

Throughout the following chapter, you will be referred to these chapters for host-specific information.

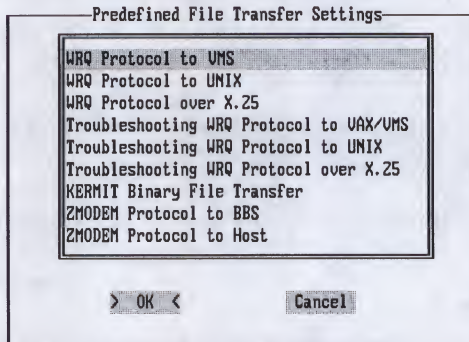
Configuring Reflection for the WRQ Protocol

Configure Reflection to use the WRQ protocol as follows:

1. Choose Transfer Setup from the File menu to open the File Transfer Setup dialog box.

For a detailed description of all the fields in this dialog box, see page 190 for settings common across protocols and page 200 for settings used by the WRQ protocol.

2. Choose Predefined Settings in the File Transfer Setup dialog box to display a dialog box similar to the following:



Predefined File Transfer Settings Dialog Box

From the Predefined File Transfer Settings dialog box, select the WRQ Protocol option appropriate for your host, then choose OK.

Each predefined option configures a series of items; *WRQ Protocol to VMS* is shown on page 192 and *WRQ Protocol to UNIX* is shown on page 193.

3. You will be warned of configuration changes affecting other dialog boxes; to accept the changes, choose OK.
4. File transfer settings appropriate for your host appear in the File Transfer Setup dialog box. To accept the settings, choose OK.
5. Choose Save from the File menu to save the file transfer settings to your current configuration file, or choose Save As to specify a different configuration file.

Host Startup Sequence

Reflection provides a default Host Startup Sequence in the File Transfer Setup dialog box to start the the WRQ host program. If your transfers fail with one of the following errors, the default startup sequence is not correct for your host program:

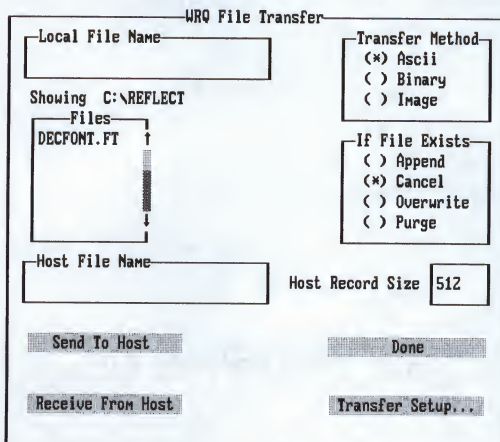
“No host response”
“Timeout (receive)”

Find out how to execute the WRQ host program at your host prompt. Enter the same string in the Host Startup Sequence box. See the chapter on using the WRQ protocol with your host for more information.

Sending Files Using the WRQ Protocol

After you configure Reflection for WRQ transfers, send files to your host computer as follows:

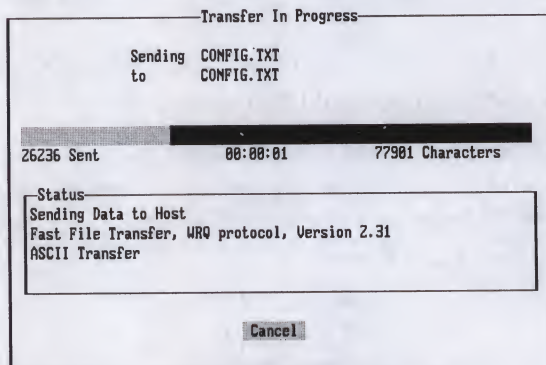
1. Start Reflection, establish a connection and log on to your host computer. Be sure your logon enables you to read and write files.
2. Choose Transfer from the File menu to display the dialog box below. For a detailed description of all the fields in this dialog box, see page 183.



WRQ File Transfer Dialog Box

3. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
4. You can optionally specify a different host file name in the Host File Name text box. See page 379 for more information.
5. Select the appropriate Transfer Method. See the chapter on using the WRQ protocol with your host for more information.
6. Specify what action you want taken if the host file already exists. See the chapter on using the WRQ protocol with your host for more information.
7. Enter a host record size if your host application has certain requirements. See the chapter on using the WRQ protocol with your host for more information.

8. To transfer the file, choose Send To Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



WRQ Transfer in Progress Dialog Box—Sending

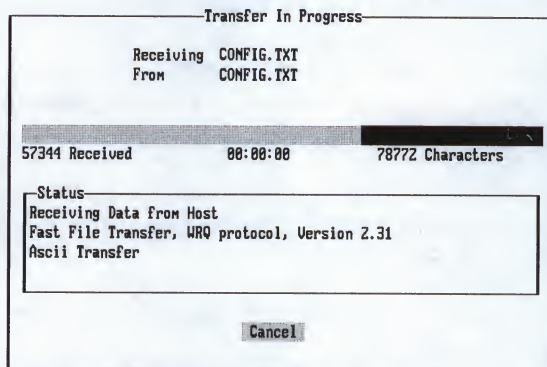
When the transfer completes, the Transfer in Progress dialog box closes.

Receiving Files Using the WRQ Protocol

After you configure Reflection for WRQ transfers, receive files from your host computer as follows:

1. Start Reflection, establish a connection and log on to your host computer. Be sure your logon enables you to read and write files.
2. Choose Transfer from the File menu to display the WRQ File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
3. Type the name of the file you want to receive in the Host File Name text box. See page 379 for more information.
4. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
5. Select the appropriate Transfer Method. See the chapter on using the WRQ protocol with your host for more information.

6. Specify what action you want taken if the PC file already exists. See page 187 for more information.
7. To transfer the file, choose Receive From Host.
8. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



WRQ Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Wildcard Transfers Using the WRQ Protocol

The WRQ protocol supports wildcard transfers to and from your host computer. When you set up a wildcard transfer, you can include wildcard characters in the File Name text box for the system that is *sending* the files. Use the wildcard characters recognized by that system:

- ▲ When transferring files from the PC to the host, use the DOS wildcard characters in the Local File Name text box.
- ▲ When transferring files from the host to the PC, use the wildcard characters appropriate for the host in the Host File Name text box. See the chapter on using the WRQ protocol with your host for more information.

Wildcard characters *cannot* be used in the File Name text box for the system that is receiving the files. For the receiving system, whether PC or host, you can:

- ▲ Leave the File Name text box blank; the files go to your current group or directory
- ▲ Use the File Name text box to specify a non-current group or directory for the files

When you perform a wildcard transfer, the files retain the names they had on the originating system. When transferring from the host to the PC, host file names are truncated as needed to conform to DOS file naming conventions.

The Transfer in Progress dialog box displays the name of each file being sent or received. If an error occurs during a transfer, the remaining files that match the wildcard specification are not transferred.

If you want Reflection to continue sending (or receiving) files following an error during a wildcard transfer, you must:

- ▲ Use Reflection command language to transfer the files
- ▲ Set Reflection's CONTINUE parameter to ON

See the *Reflection Command Language* manual for more information.

Within a wildcard transfer, all files transferred use the same settings for:

- ▲ Transfer Method
- ▲ If File Exists
- ▲ Host Record Size (only applies when transferring to the host)

ASCII and binary files must be transferred separately.

Note: The Reflection SEND and RECEIVE commands support wildcard transfers. In addition, they provide syntax that allows you to:

- ▲ Apply time/date filters to wildcard transfers.
- ▲ Exclude files or groups of files from a wildcard transfer.
- ▲ Transfer a host file only when it has a more recent time/date than an existing PC file of the same name.

See the Reflection *Command Language* manual.

WRQ Protocol Command Language

If you prefer, you can use the Reflection command language SEND and RECEIVE commands to perform WRQ transfers. The commands SERVER and FINISH allow you to execute your WRQ host program in server mode.

Command language also offers the following WRQ-related Reflection SET parameters:

- SET COMPRESSION
- SET FAST-FILE-XFER
- SET FORCE-CTERM-FRAME-SIZE
- SET HOST-START-WRQ
- SET HOST-STARTUP
- SET TRANSFER-END-CHAR
- SET TRANSFER-EXTRA-CHARS
- SET TRANSFER-FRAME-SIZE
- SET TRANSFER-HOST-RECORD-SIZE
- SET TRANSFER-PRESENTATION
- SET TRANSFER-START-CHAR
- SET TRANSFER-WINDOW-SIZE

See the Reflection *Command Language* manual for more information.

WRQ Transfers with VMS Systems

This chapter contains information specific to using the WRQ protocol with VMS systems.

Host Startup Sequence

To configure Reflection for WRQ transfers with VMS systems, select *WRQ Protocol to VMS* in the Predefined File Transfer Settings dialog box. For instructions, see page 391.

If you plan to run VAXLINK2 from the directory where it is installed, use the Host Startup Sequence *RUN VAXLINK2* to transfer files.

If you plan to run VAXLINK2 from other directories, see “Defining VMS Logicals and Foreign Commands” beginning on page 409. The Host Startup Sequence should use the logical name or foreign command you define.

File Transfer Dialog Box

For general information on the File Transfer dialog box, see page 183. For the WRQ protocol file transfer procedure, see page 393.

The following discussion is specific to using the File Transfer dialog box with VMS systems.

Host File Name

PC (DOS) file names and VMS file names are similar—both can include a file name and a file extension. DOS files are restricted to an eight character name and three character extension; AUTOEXEC.BAT is an example.

VMS supports longer file names and file extensions such as:

INVENTORY.COUNT

It also supports multiple versions of a file by appending a version number to the file specification:

```
INVENTORY.COUNT;<version number>
```

By default, when you transfer a VMS file, if there are multiple versions, the copy with the highest version number is transferred. To control which version is transferred, specify the version number in the Host File Name text box:

```
INVENTORY . COUNT ; 2
```

When VMS files are transferred to the PC, their names and extensions are truncated (as needed) and version numbers ignored to comply with DOS naming conventions; the name above is truncated to INVENTOR.COU.

You can enter a valid VMS host file name in the Host File Name text box. In addition, you can enter any of the following:

- ▲ VMS device name
- ▲ VMS directory name
- ▲ VMS logical that identifies a device and/or directory
- ▲ VMS wildcard characters

Also, see page 404 for the host file name switches that can also be entered in the Host File Name text box.

VMS Devices, Directories, and Logicals

Sending a file to the VMS system:

By default, when you transfer to the VMS system, the file goes to your current directory. At the DCL prompt, type `SHOW DEFAULT` and press **Enter** to see your current directory displayed in square brackets. For example:

```
DISK1$USERS:[MAX.INVENTORY]
```

To transfer the file to another destination, use VMS device, directory, or logical information in the Host File Name text box. For example, if your current directory is MAX.INVENTORY, send the file to MAX.REPORTS by entering the following in the Host File Name text box (include the square brackets):

```
[MAX . REPORTS]
```


To transfer a file to the OCTOBER subdirectory of your current directory, enter:

```
[.OCTOBER]
```

If you want to transfer files to a directory on a different device, you can refer to the device and directory, or you can use a logical that refers to them. If DISK2\$USERS has been defined as a logical for the USERS directory of the \$2\$DIA device, you can use the logical to transfer files to the JO subdirectory of USERS:

```
DISK2$USERS:[JO]
```

Receiving a file from the VMS system:

To transfer a file from your current VMS directory, enter the VMS file name in the Host File Name text box. To transfer a file from a different VMS directory, include the VMS device, directory, or logical information in the Host File Name text box with the file name.* For example, if your current directory is MAX.INVENTORY, transfer the file PROFILE.SALES from MAX.REPORTS by entering the following in the Host File Name text box (the square brackets are required):

```
[MAX.REPORTS]PROFILE.SALES
```

To transfer a file INVENTORY.COUNT from the OCTOBER subdirectory of your current directory, enter:

```
[.OCTOBER]INVENTORY.COUNT
```

To transfer the file REPORT.DOC from a directory on a different device, you can use a logical:

```
DISK2$USERS:[JO]REPORT.DOC
```

VMS Wildcard Character

The VMS wildcard character, the asterisk (*), can be used in the Host File Name text box. The asterisk can be used in file names and directory specifications. Use it only when files are being transferred from the host to the PC.

* Reflection may have problems parsing the file name when VMS device, directory, or logical information is included in the Host File Name text box. If your transfer fails with the "Disk (DOS) error" message, enter a DOS directory or a local file name in the Local File Name text box.

VMS supports multiple versions of a file. The VMS wildcard character should *not* be used in place of a version number—since multiple versions will share the same name, only one of the versions can be accommodated by DOS.

Each VMS file in a wildcard transfer must produce a unique DOS file name in order to transfer successfully. When the following files are included in a wildcard transfer, the file names will be truncated; only one file named PROFILE\$.SAL can reside on the PC:

```
PROFILE$Q1.SALES  
PROFILE$Q2.SALES  
PROFILE$Q3.SALES
```

Before performing a wildcard transfer from the VMS system to your PC, use the VMS DIR command to preview the files that meet your wildcard specification. This can help you determine whether your VMS files will yield unique DOS file names, and will also show you how many files will be transferred.

Transfer Method

The Transfer Method determines whether data and file manipulation are performed as part of the file transfer.

ASCII

Use this method to transfer text files. The ASCII File Transfer Options Setup dialog box contains file conversion options that can be set for these transfers; see page 196.

PC word processing documents must be saved as *text-only* before they can be transferred using the ASCII method. If you are transferring word processing documents between two PCs via a VMS host, use the binary method below.

An ASCII transfer to a VMS host produces an ASCII file on the host with variable-length records.

Binary

Use this method to transfer program-specific PC files between two PCs via the VMS system. The binary method is also appropriate for non-text files that can be shared by a PC and host application. No file conversion occurs using this method.

A binary transfer to a VMS host produces a binary file on the host with fixed-length records. The value that appears in the Host Record Size text box determines the record length.

Image

Use this method to transfer host-specific files between two VMS systems via a PC. The image method includes the VMS file's Record Management Services (RMS) attributes, such as the file's organization and record type, in the file stored on the PC. When this PC file is transferred back to a VMS system using the image method, the attributes are used to reconstruct the original host file.

VMS files that can be transferred using the image method include:

- ▲ .OBJ files
- ▲ .EXE files
- ▲ .MAI files
- ▲ Indexed files

If File Exists

Cancel

Selecting *Cancel* will only result in the transfer being cancelled if you specify a file name *and* version number that already exist on the VMS system. If the file is part of a wildcard transfer, no other files are transferred after a duplicate is found. (See page 396 for exception.)

If you specify an existing file name but give no version number, the file will be transferred and assigned the next version number. For example, if you are transferring *FILE.DAT* to the VMS host, and *FILE.DAT;1* and *FILE.DAT;2* currently exist, a new file is named *FILE.DAT;3* will be created.

Overwrite

The latest version of an existing file is overwritten. If there is no existing file, the file is created.

Append

Appends the file to the latest version of an existing file. If there are no existing files, a file is created.

Purge

Creates a new file using the next version number and deletes any existing files. If there are no existing files, the version number "1" is used.

Host Record Size

If your Transfer Method is *Binary*, Host Record Size sets the record length for fixed-length records, and the maximum record length for variable-length records. Use the record size expected by the host program that will use the file. If you are in doubt as to the size, check another host file used by the same program by typing `DIR/FULL <host file name>` at the DCL prompt.

The methods *ASCII* and *Image* do not make use of this value. When sending ASCII files using fast file transfer, Reflection stops the transfer if any record is longer than 32,767 bytes.

Host File Name Switches

The WRQ protocol supports the following host file name switches. You can append the switches listed below to the file name in the Host File Name text box.

For example, to submit the file RALPH.DAT to the VMS print spooler, enter the following in the Host File Name text box:

```
RALPH.DAT/S
```

The VAXLINK2 startup parameters, which are different from these host file name switches, are covered on page 407.

/A ASCII transfer: Set Maximum Record Length

When transferring ASCII files to the VMS host with fast file transfer, you can specify that the maximum record length be set in the file header of the resulting host file. Adding this switch slows down fast file transfer—by default, the maximum record size on ASCII files is not specified. If you use this switch when fast file transfer is not available, it is simply disregarded.

/B Block Mode

This switch forces VAXLINK2 to read the host file in block mode rather than in record mode for binary transfers from the host.

Use /B when you receive a binary file that does not have fixed record lengths and you want to retain record separators. This is equivalent to an image transfer without the image header information.

/C Submit Files to Batch Queue

Applies to ASCII transfer to the host only. Submits the file or files to the batch queue (SYS\$BATCH) upon completion of the transfer. The SEND command parameter equivalent for this qualifier is SUBMIT. Files are deleted on the host after they have been submitted; see /K below.

/D DECDx Format Files

Applies to binary file transfer only. /D transfers files in DECDx format between the VMS system and PC. This is equivalent to the COUNTED parameter of the SEND command.

/F Fixed Length Records

The /F switch was used with VAXLINK to specify fixed length binary files. This is the file format that VAXLINK2 creates by default—the /F qualifier is offered only for backward compatibility with the older protocol.

/I Image Transfer Method

The /I switch was used with VAXLINK to specify a file transfer method of image. This method can now be set at the File Transfer screen; the /I qualifier is offered only for backward compatibility with the older protocol.

/K Keep Submitted Files

This qualifier is valid only in conjunction with the /C or /S qualifier, both of which submit files to a queue on the host. Once the files are in the queue, they are normally deleted. To keep a copy of the file on the host, use the /K (Keep) switch. The SEND command parameter equivalent for this qualifier is SUBMIT KEEP or PRINT KEEP.

/L Add Linefeed

Binary file transfers from the host only. This switch causes a linefeed character to be appended to the end of each record when receiving a file that has carriage control. The linefeed character is added to the record even if the carriage control isn't stream-lf.

/P Translate Carriage Control Characters

ASCII or binary file transfers from the host only. Use this switch to translate FORTRAN or PRINT carriage control characters in VMS files.

If you don't use this switch on files that contain printer carriage control characters, set DISABLE-TRANSLATION to YES to prevent these control characters from being translated unpredictably. When carriage control characters are *not* translated, they become part of the file's records. To discard these characters, use the /T switch (see below). The RECEIVE command parameter equivalent for this qualifier is CCTL.

/S Spool Files to Printer

ASCII file transfer to host only. Submits the file or files to the print queue (SYS\$PRINT) upon completion of the transfer. This is equivalent to the PRINT parameter of the SEND command. Files are deleted on the host after they have been submitted; see /K on page 405 to override this.

/T Discard Carriage Control Characters

ASCII or binary file transfers from the host only. This switch discards FORTRAN or PRINT carriage control characters in VMS files. To translate these characters, use the /P switch (see above).

/V Variable Host Record Size

Binary file transfers to the host only. Creates the host file with variable-length records (the default is fixed). The SEND command equivalent for this qualifier is USING "/FORMAT=VARIABLE".

/W Block Mode Binary

Binary file transfers from the host only. This switch supports the block mode binary transfer required for files created by applications such as the DOS and VMS versions of Lotus 1-2-3, and WordPerfect. The WRQ protocol uses fixed 512-byte record file by default, so this switch is normally not required.

Startup Parameters for VAXLINK2

Default values used for WRQ protocol file transfers to a VMS system can be altered with the parameters described below. To pass VAXLINK2.EXE a parameter, you must first define a *foreign command* for the program—see page 409 for instructions.

Once a foreign command called VAXLINK2 has been defined, use it in combination with the version number parameter, V, as shown:

```
VAXLINK2 V
```

Foreign commands and parameters can be used in the Host Startup Sequence of the File Transfer Setup dialog box.

The host file name switches (different from these VAXLINK2 startup parameters) are covered on page 404.

C Disable Checksum for FFT

Use this parameter as part of the Host Startup Sequence to disable error-checking for fast file transfer.

E<n> Maximum Packet Fragments for FFT

Use this parameter as part of the Host Startup Sequence to set the maximum packet fragments for fast file transfer. The valid range is 1–4, the default is 4.

F<n> Maximum Frame Size for FFT

Use this parameter as part of the Host Startup Sequence to set the maximum frame size for fast file transfer. The valid range is 256–1490, the default is 1490.

H VAXLINK2 Startup Parameters

Type `VAXLINK2 H` at the VMS host prompt to display a summary of VAXLINK2 parameters.

L Host Log File

Use this parameter as part of the Host Startup Sequence to create a log file of the file transfer called `WRQLOG`.

N<n> Host Retry Limit

When there is no response from the PC, the file transfer is attempted a default of 5 times before giving up. Use this parameter as part of the Host Startup Sequence to set the retry limit to <n> consecutive times (<n> must be an integer).

P<n> Maximum Packet Size

Use this parameter as part of the Host Startup Sequence to set a maximum packet size for file transfer. The valid range is 512–4096, the default is 4096.

R<n> “Reads” Queued

VAXLINK2 tries to queue up several reads at a time in order to speed up the terminal I/O. Use this parameter as part of the Host Startup Sequence to set the number of reads that can be queued up. The value of <n> must be between 1 and 5; the default for most connections is 5. If VAXLINK2 detects that you have a LAT or CTERM connection, <n> is set to 1.

S Host File Name Switches

Type `VAXLINK2 S` at the VMS host prompt to display a list of host file name switches, described on page 404.

T<seconds> VAXLINK2 Timeout

Use this parameter as part of the Host Startup Sequence to set the host timeout interval—the maximum number of seconds VAXLINK2 should wait to hear from Reflection. The default host timeout is 30 seconds. This value should be at least 5 seconds greater than Reflection’s Receive Timeout field in the File Transfer Setup dialog box.

V Version Number

Type `VAXLINK2 V` at the VMS host prompt to display the program's version number.

W<n> Packet Delay for FFT

Use this parameter as part of the Host Startup Sequence to set a packet delay (unit is .01 seconds) for fast file transfer. For example, the parameter `W3` sets a packet delay of .03 seconds. The default is 0.

X<n> Retransmit Limit

During file transfer, blocks may need to be retransmitted. Use this parameter as part of the Host Startup Sequence to set the maximum number of retransmits to be performed before quitting. The default is 10.

Defining VMS Logicals and Foreign Commands

VMS logicals and foreign commands provide two slightly different ways of making reference to the host program, `VAXLINK2.EXE`.

Checking for a VAXLINK2 Logical or Foreign Command

System administrators can set up logicals and foreign commands that take effect system-wide. You can check your system to see whether `VAXLINK2` has been defined as a logical or a foreign command.

Enter the following at the DCL prompt to see whether `VAXLINK2` has been defined as a logical:

```
SHOW LOGICAL VAXLINK2
```

The output for an existing logical will look something like this:

```
"VAXLINK2" = "<path>:VAXLINK2.EXE" (LNM$PROCESS_TABLE)
```

To see whether `VAXLINK2` has been defined as a foreign command, enter:

```
SHOW SYMBOL VAXLINK2
```

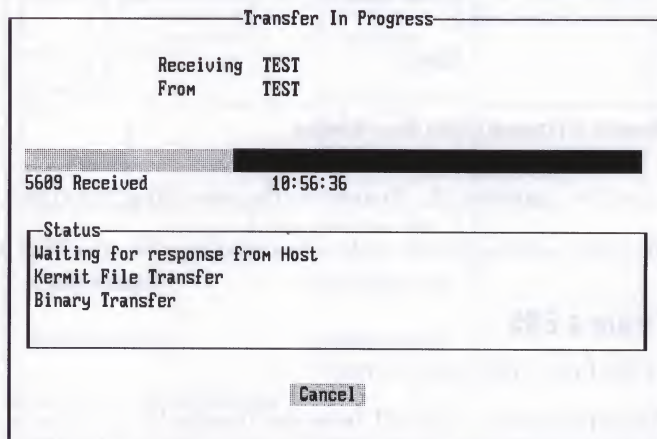
The output will look something like this:

```
VAXLINK2 == "$<path>:VAXLINK2.EXE"
```


6. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.

When your Transfer Method is *ASCII*, the settings in the ASCII File Transfer Options Setup dialog box are used.

7. Specify which action you want taken if the PC file already exists: *Append*, *Cancel*, or *Overwrite*.
8. To transfer the file, choose Receive From Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



Kermit Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Kermit Transfers with Host Systems

If the Kermit protocol is available on your host computer, you can use it to transfer files between your PC and the host.

Sending a File to a Host

To send a file to a host using Kermit:

1. Start Reflection and select *KERMIT* from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Log onto the host and invoke the host Kermit program by typing *KERMIT* (or the string used by your particular version of Kermit) at the host prompt.
3. Prepare to transfer the file by typing *RECEIVE* at the host's Kermit prompt.
4. Choose Transfer from the File menu to display the Kermit File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
5. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
6. You can optionally specify a different host file name in the Host File Name text box. See page 379 for more information.
7. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.

When your Transfer Method is *ASCII*, the settings in the ASCII File Transfer Options Setup dialog box are used.

8. To transfer the file, choose Send To Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.

When the transfer completes, the Transfer in Progress dialog box closes. To exit the Kermit program, type *EXIT* at the Kermit prompt.

Note: The If File Exists options do not apply when sending a file to the host. ▲

Receiving a File from a Host

To receive a file from a host using Kermit:

1. Start Reflection and select **KERMIT** from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Log onto the host and invoke the host Kermit program by typing **KERMIT** (or the string used by your particular version of Kermit) at the host prompt.
3. Prepare to transfer the file by typing **SEND <filename>** at the host's Kermit prompt.
4. Choose Transfer from the File menu to display the Kermit File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
5. Specify a local file name by selecting a name from the Files list box or typing a name in the Local File Name text box.
6. Select the appropriate Transfer Method for the file you are transferring: **ASCII** or **Binary**.

When your Transfer Method is **ASCII**, the settings in the ASCII File Transfer Options Setup dialog box are used.

7. Specify which action you want taken if the PC file already exists: **Append**, **Cancel**, or **Overwrite**.
8. To transfer the file, choose **Receive From Host**.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose **Cancel** or press **Esc**.

When the transfer completes, the Transfer in Progress dialog box closes. To exit the Kermit program, type **EXIT** at the Kermit prompt.

Using Kermit's Server Mode

If the Kermit program on your host has a server mode, you can transfer files using the following procedure:

1. Start Reflection.
2. Select *KERMIT* from the Transfer Protocol list box and *SERVER* from the Kermit Host Mode list box in the File Transfer Setup dialog box. For information on Kermit Host Mode, see page 208.
3. Log onto the host and invoke the host Kermit program by typing *KERMIT* (or the string used by your particular version of Kermit) at the host prompt.
4. Put the host Kermit program in server mode by typing *SERVER* at the Kermit prompt and pressing **Enter**.
5. Choose Transfer from the File menu to display the Kermit File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
6. Use the dialog box to transfer files to and from your host computer as described in the preceding procedures.
7. When you have finished transferring files, choose Command Line from the Tools menu (or press **Alt-F10**) to display the Reflection command line:
 - ▲ To exit Kermit's server mode without exiting Kermit, type *KFINISH* on the command line and press **Enter**.
 - ▲ To terminate the Kermit program and log out of the host, type *KBYE* and press **Enter**.

To exit the Kermit program, type *EXIT* at the Kermit prompt.

Using Kermit for PC to PC Transfers

Kermit can be used to transfer files between two personal computers (for example, a PC and a Macintosh, or a PC and a PC) using two copies of Reflection.

If the WRQ protocol is available, however, it may be more efficient to transfer the files via your host computer: use the WRQ protocol to send the PC files to the host and then to receive them on the other PC.

To perform a PC to PC transfer using Kermit:

1. Connect the two computers using a *null modem cable* (a serial cable that has pins 2 and 3 crossed), and start Reflection on both of them.
2. Make sure that both computers are using the same baud and parity settings.

To test your connection and settings, type at one of the computers—when the connection is correct, the letters you type will appear on the other computer.

3. On both computers, select **KERMIT** from the Transfer Protocol list box in the File Transfer Setup dialog box.
4. On both computers, choose Transfer from the File menu to display the Kermit File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
5. On the sending computer, select the file you want to send from the Files list box, or type the name in the Local File Name text box.
6. On the receiving computer, specify a file name for the file to be received by selecting a name from the Files list box or typing a name in the Local File Name text box.
7. On the sending computer, choose Send to Host.
8. On the receiving computer, choose Receive from Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **Esc**.

When the transfer completes, the Transfer in Progress dialog box closes.

Wildcard Transfers Using the Kermit Protocol

The Kermit protocol supports wildcard transfers to and from your host computer. When you set up a wildcard transfer, you can include wildcard characters in the File Name text box for the system that is *sending* the files. Use the wildcard characters recognized by that system:

- ▲ When transferring files from the PC to the host, use the DOS wildcard characters in the Local File Name text box.
- ▲ When transferring files from the host to the PC, use the wildcard characters appropriate for the host in the Host File Name text box.

Wildcard characters *cannot* be used in the File Name text box for the system that is receiving files. Leave the File Name text box for the receiving system blank. The files go to your current group or directory and retain the names they had on the originating system. When transferring from the host to the PC, host file names are truncated as needed to conform to DOS naming conventions.

The Transfer in Progress dialog box displays the name of each file being sent or received. If an error occurs during a transfer, the remaining files that match the wildcard specification will not be transferred.

Within a wildcard transfer, all files transferred use the same settings for:

- ▲ Transfer Method
- ▲ If File Exists (used only when receiving files from host)

ASCII and binary transfers must be performed separately.

Kermit Command Language

If you prefer, you can use the Reflection command language KSEND and KRECEIVE commands to perform Kermit transfers. If your host Kermit program is in server mode, use the KGET, KFINISH, and KBYE commands.

Command language also offers the following Kermit-related Reflection SET parameters:

- SET KERMIT-CHECKSUM
- SET KERMIT-HOST-MODE
- SET KERMIT-PACKET-SIZE
- SET KERMIT-RECEIVE-START
- SET KERMIT-SEND-START

See the *Reflection Command Language* manual for more information.

File Transfers Using Zmodem

Zmodem is a public domain protocol available on most bulletin board services (BBS), and on some host systems. Reflection's default configuration supports *automatic downloading* from a BBS using the Zmodem protocol. With automatic downloading, you simply initiate the download from the BBS—Reflection begins a Zmodem receive, automatically, when it detects the Zmodem header packet.

For Zmodem transfers with host systems, and uploads to a BBS using Zmodem, you must configure Reflection for the transfers, as described next.

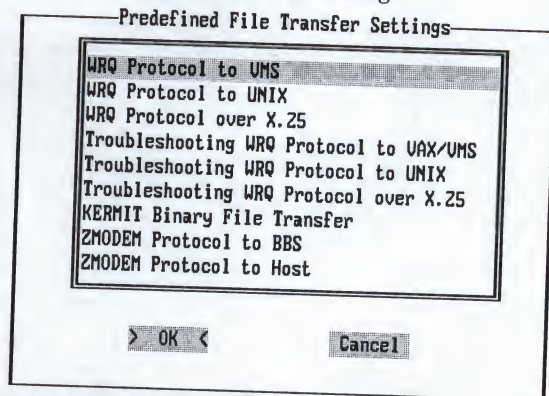
Configuring Reflection for the Zmodem Protocol

Configure Reflection to use the Zmodem protocol as follows:

1. Choose Transfer Setup from the File menu to open the File Transfer Setup dialog box.

For a detailed description of all the fields in this dialog box, see page 190 for settings common across protocols and page 209 for settings used by the Zmodem protocol.

2. Choose Predefined Settings in the File Transfer Setup dialog box to display a dialog box similar to the following:



Predefined File Transfer Settings Dialog Box

3. From the Predefined File Transfer Settings dialog box, select the Zmodem Protocol option appropriate for your transfer to either a BBS or host, then choose OK.

Each predefined option configures a series of items; *ZMODEM Protocol to BBS* is shown on page 196 and *ZMODEM Protocol to Host* is shown on page 196.

4. File transfer settings appropriate for your transfer appear in the File Transfer Setup dialog box. To accept the settings, choose OK.
5. Choose Save from the File menu to save the file transfer settings to your current configuration file, or choose Save As to specify a different configuration file.

Startup Sequences

When you select *ZMODEM Protocol to Host* in the Predefined File Transfer Settings dialog box, the following startup sequences are displayed in the File Transfer Setup dialog box:

Host Receive Startup Sequence *rz*

Host Send Startup Sequence *sz**

These startup sequences should contain the program names or commands that start Zmodem receives and Zmodem sends, respectively, on your host system. If you provide the correct startup sequences, Reflection will automatically start the appropriate Zmodem program on your host when you perform a file transfer.

If Zmodem transfers with your host fail, contact your system administrator for the correct startup sequences. If you do not provide startup sequences for your host, you must manually start the Zmodem receive or Zmodem send program on the host before you can perform a file transfer.

* If you receive files from a VMS system using Zmodem, you must define a VMS foreign command that executes your Zmodem send program on the host so that Reflection can pass the host file name as a startup parameter. Use the foreign command that you define as your Host Send Startup Sequence. See page 411 for information on VMS foreign commands.

Zmodem Transfers with Bulletin Board Services

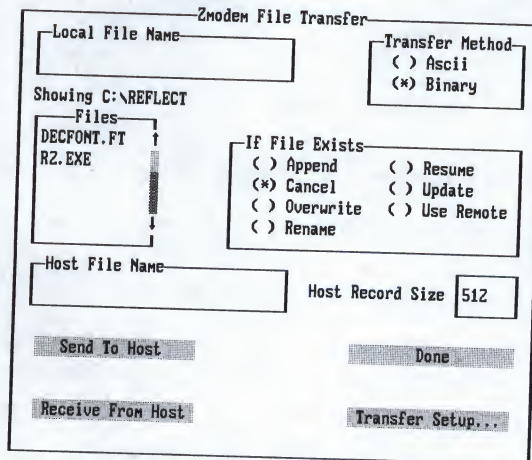
The Zmodem protocol is often used for transferring files to and from bulletin board services (BBS); the procedures that follow describe how to do this.

The send procedure that follows assumes that you have already selected *ZMODEM Protocol to BBS* in the Predefined File Transfer Settings dialog box (see page 431 for instructions). The receive procedure using automatic downloading (page 434) does not require that Reflection be configured for the Zmodem protocol.

Sending a File to a BBS

To send a file to a BBS using Zmodem:

1. Start Reflection and establish a connection to the BBS.
2. After connecting to the BBS, take the steps required to prepare the BBS to receive an uploaded file; specify the Zmodem protocol on the BBS.
3. Choose Transfer from the File menu to display the dialog box below. For a detailed description of all the fields in this dialog box, see page 183.



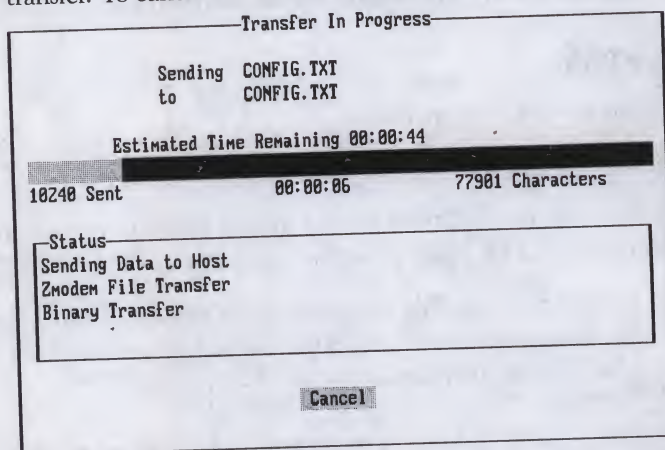
Zmodem File Transfer Dialog Box

4. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.

5. Select the appropriate Transfer Method for the file you are transferring: ASCII or Binary.

When your Transfer Method is ASCII, the settings in the ASCII File Transfer Options Setup dialog box are used.

6. To transfer the file, choose Send To Host.
7. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



Zmodem Transfer in Progress Dialog Box—Sending

When the transfer completes, the Transfer in Progress dialog box closes.

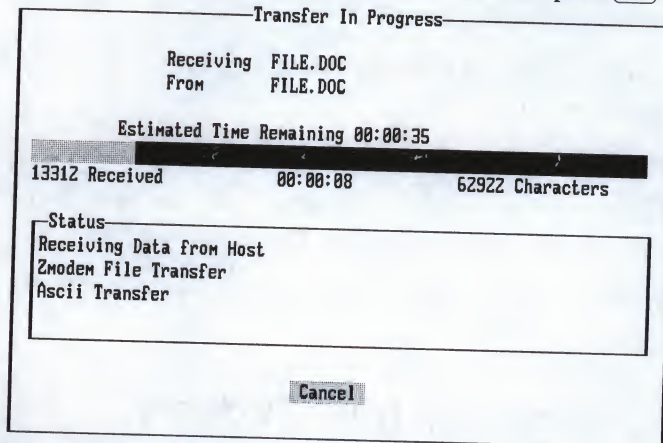
Note: The If Local File Exists options do not apply when sending a file to a BBS. ▲

Receiving a File from a BBS: Automatic Downloading

To receive a file using Zmodem's automatic downloading feature, the Allow Automatic Downloading check box must be selected in the File Transfer Setup dialog box—this is Reflection's default setting.

1. Start Reflection and establish a connection to the BBS.
2. After connecting to the BBS, take the steps required to prepare the BBS to download a file; specify the Zmodem protocol on the BBS and the file to be transferred.

3. Initiate the transfer from the bulletin board. Reflection automatically begins a Zmodem receive when it detects a Zmodem header packet. With automatic downloading:
 - ▲ You cannot specify a local file name.
 - ▲ The setting you've chosen for If Local File Exists in the File Transfer Setup dialog box is observed.
 - ▲ If Zmodem is the currently selected protocol, the setting you've chosen for Default Method in the File Transfer Setup dialog box is observed.
 - ▲ If Zmodem is *not* the current protocol, Reflection will use the binary transfer method.
4. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **Esc**.



Zmodem Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Receiving a File from a BBS: Manual Method

If you clear the Allow Automatic Downloading check box in the File Transfer Setup dialog box, after initiating the transfer from the bulletin board, you must manually receive the file:

1. Choose Transfer from the File menu to display the Zmodem File Transfer dialog box.
2. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
3. Select the appropriate Transfer Method for the file you are transferring: ASCII or Binary.

When your Transfer Method is ASCII, the settings in the ASCII File Transfer Options Setup dialog box are used.

4. Specify which action you want taken if the local file already exists; see page 211 for a description of the options.
5. To transfer the file, choose Receive From Host.
6. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **Esc**.

When the transfer completes, the Transfer in Progress dialog box closes.

Zmodem Transfers with Host Systems

If the Zmodem protocol is available on your host computer, you can use it to transfer files between your PC and the host.

The following send and receive procedures assume that you have already selected *ZMODEM Protocol to Host* in the Predefined File Transfer Settings dialog box, and that you have determined the correct startup sequences for your host (page 432).

Sending a File to a Host

To send a file to a host using Zmodem:

1. Start Reflection and establish a connection with your host computer.

Note: If you have not provided the correct Host Receive Startup Sequence for your host, you must manually start the Zmodem receive program on the host before you can perform the transfer. ▲

2. Choose Transfer from the File menu to display the Zmodem File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
3. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
4. You can optionally specify a different host file name in the Host File Name text box. See page 379 for more information.
5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.

When your Transfer Method is *ASCII*, the settings in the ASCII File Transfer Options Setup dialog box are used.

6. To transfer the file, choose Send To Host.
7. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.

When the transfer completes, the Transfer in Progress dialog box closes.

Note: The If Local File Exists options do not apply when sending a file to the host.

Receiving a File from a Host

To receive a file from a host using Zmodem:

1. Start Reflection and establish a connection with your host computer.

Note: If you have not provided the correct Host Send Startup Sequence for your host, you must manually start the Zmodem send program on the host before you can perform the transfer. ▲

2. Choose Transfer from the File menu to display the Zmodem File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.

3. Type the name of the file you want to receive in the Host File Name text box. See page 379 for more information.
4. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.

When your Transfer Method is *ASCII*, the settings in the ASCII File Transfer Options Setup dialog box are used.

6. Specify which action you want taken if the local file already exists; see page 211 for a description of the options.
7. To transfer the file, choose Receive From Host.
8. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.

When the transfer completes, the Transfer in Progress dialog box closes.

Wildcard Transfers Using the Zmodem Protocol

The Zmodem protocol supports wildcard transfers to and from your host computer. When you set up a wildcard transfer, you can include wildcard characters in the File Name text box for the system that is *sending* the files. Use the wildcard characters recognized by that system:

- ▲ When transferring files from the PC to the host, use the DOS wildcard characters in the Local File Name text box.
- ▲ When transferring files from the host to the PC, use the wildcard characters appropriate for the host in the Host File Name text box.

Wildcard characters *cannot* be used in the File Name text box for the system that is receiving files. When you are transferring files from the PC to the host, leave the Host File Name text box blank. The files are transferred to your current group or directory and retain the names they had on the PC.

When you are transferring files from the host to the PC, you can optionally use the Local File Name text box to specify a non-current PC directory for the files. Host file names are truncated as needed to conform to DOS file naming conventions.

The Transfer in Progress dialog box displays the name of each file being sent or received. If an error occurs during a transfer, the remaining files that match the wildcard specification are not transferred.

If you want Reflection to continue sending (or receiving) files following an error during a wildcard transfer, you must set Reflection's CONTINUE parameter to ON. See the Reflection *Command Language* manual for more information.

Within a wildcard transfer, all files transferred use the same settings for:

- ▲ Transfer Method
- ▲ If Local File Exists (used only when receiving files from host)

ASCII and binary transfers must be performed separately.

Zmodem Command Language

If you prefer, you can use the Reflection command language ZSEND and ZRECEIVE commands to perform Zmodem transfers.

Command language also offers the following Zmodem-related Reflection SET parameters:

```
SET ZMODEM-ALLOW-AUTO-DOWNLOAD
SET ZMODEM-DELETE-CANCELLED-FILES
SET ZMODEM-DISPOSITION
SET ZMODEM-PACKET-SIZE
SET ZMODEM-START-REMOTE-RECEIVE
SET ZMODEM-START-REMOTE-SEND
SET ZMODEM-TRANSLATE-CHARS
```

See the Reflection *Command Language* manual for more information.

File Transfers Using Xmodem

Xmodem is a public-domain file transfer protocol available on most bulletin board services (BBS), and some host systems. The Xmodem protocol supports binary file transfers only (the *Binary Transfer Method* is always selected in the Xmodem File Transfer dialog box).

The Xmodem protocol does not support wildcard transfers. If available, the Kermit and Zmodem protocols are both preferred over Xmodem because they are faster and provide wildcard support.

Xmodem Error Detection

Some versions of Xmodem are able to perform CRC-error checking (cyclical redundancy checking). When sending, Reflection responds to either a CRC or checksum request. When receiving, Reflection first requests CRC-error detection; if this fails, Reflection uses checksum error detection. To force checksum error detection, use the Reflection command SET XMODEM-CRC NO.

Xmodem Transfers with Bulletin Board Services

The Xmodem protocol is often used for transferring files to and from bulletin board services (BBS); the procedures that follow describe how to do this.

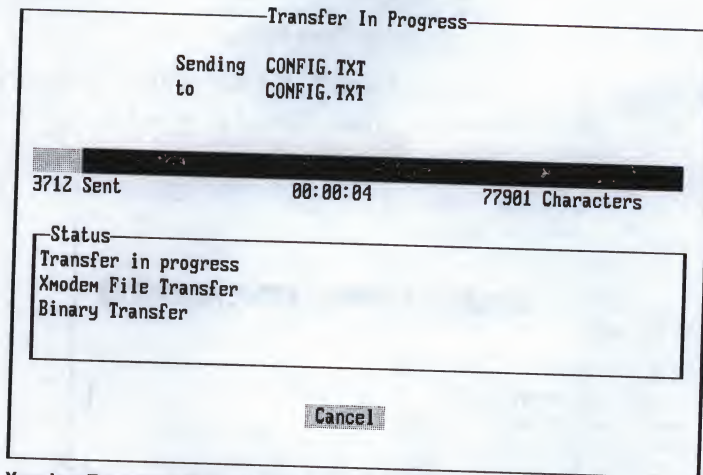
Sending a File to a BBS

To send a file to a BBS using Xmodem:

1. Start Reflection, select **XMODEM** from the Transfer Protocol list box in the File Transfer Setup dialog box, and establish a connection to the BBS.
2. After connecting to the BBS, take the steps required to prepare the BBS to receive an uploaded file; specify the Xmodem protocol on the BBS.
3. Choose Transfer from the File menu to display the dialog box below. For a detailed description of all the fields in this dialog box, see page 183.

Xmodem File Transfer Dialog Box

4. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
5. To transfer the file, choose Send To Host.
6. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **Esc**.



Xmodem Transfer in Progress Dialog Box—Sending

When the transfer completes, the Transfer in Progress dialog box closes.

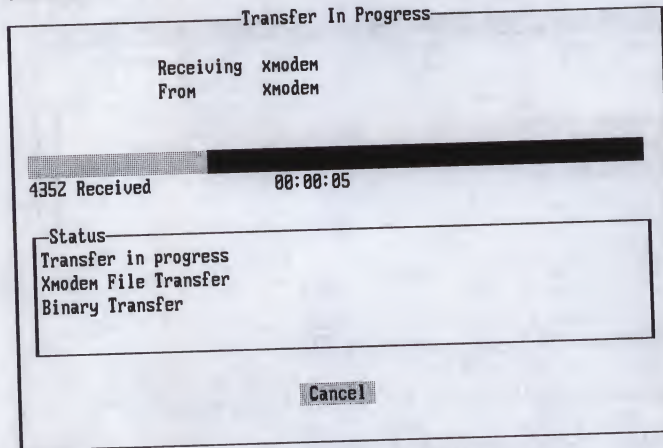
Note: The If File Exists options do not apply when sending a file to a BBS. ▲

Receiving a File from a BBS

To receive a file to a BBS using Xmodem:

1. Start Reflection, select **XMODEM** from the Transfer Protocol list box in the File Transfer Setup dialog box, and establish a connection to the BBS.
2. After connecting to the BBS, take the steps required to prepare the BBS to download a file; specify the Xmodem protocol on the BBS and the file to be transferred.
3. Initiate the transfer from the bulletin board.
4. Choose Transfer from the File menu to display the Xmodem File Transfer dialog box.
5. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
6. Specify which action you want taken if the PC file already exists: *Append*, *Cancel*, or *Overwrite*.

7. To transfer the file, choose Receive From Host.
8. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



Xmodem Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Xmodem Transfers with Host Systems

If the Xmodem protocol is available on your host computer, you can use it to transfer files between your PC and the host.

Sending a File to a Host

To send a file to a host using the Xmodem:

1. Start Reflection and select **XMODEM** from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Log onto the host. From the host prompt, invoke the Xmodem program and include parameters that specify:
 - ▲ that the host is receiving a file
 - ▲ the file name to be used on the host

3. Choose Transfer from the File menu to display the Xmodem File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
4. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
5. To transfer the file, choose Send To Host.
6. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.

When the transfer completes, the Transfer in Progress dialog box closes.

Note: The If File Exists options do not apply when sending a file to the host. ▲

Receiving a File from a Host

To receive a file from the host using Xmodem:

1. Start Reflection and select **XMODEM** from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Log onto the host. From the host prompt, invoke the Xmodem program and include parameters that specify:
 - ▲ That the host is sending a file
 - ▲ The name of the host file
3. Choose Transfer from the File menu to display the Xmodem File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
4. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
5. Specify which action you want taken if the PC file already exists: *Append*, *Cancel*, or *Overwrite*.
6. To transfer the file, choose Receive From Host.
7. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.

When the transfer completes, the Transfer in Progress dialog box closes.

Using Xmodem for PC to PC Transfers

Xmodem can be used to transfer files between two personal computers using two copies of Reflection.

If the WRQ protocol is available, however, it may be more efficient to transfer the files via your host computer: use the WRQ protocol to send the PC files to the host and then to receive them on the other PC.

To perform a PC to PC transfer using Xmodem:

1. Connect the two computers using a *null modem cable* (a serial cable that has pins 2 and 3 crossed), and start Reflection on both of them.
2. Make sure that both computers are using the same baud and parity settings.

To test your connection and settings, type at one of the computers—when the connection is correct, the letters you type will appear on the other computer.

3. On both computers, select XMODEM in the Transfer Protocol list box of the File Transfer Setup dialog box.
4. On both computers, choose Transfer from the File menu to display the Xmodem File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
5. On the sending computer, select the file you want to send from the Files list box, or type the name in the Local File Name text box.
6. On the receiving computer, the file will be placed in your current directory. To change your current directory, type a path in the Local File Name text box and pressing Enter **↵**.
7. On the sending computer, choose Send to Host.
8. On the receiving computer, choose Receive from Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press Esc **⏏**.

When the transfer completes, the Transfer in Progress dialog box closes.

Xmodem Command Language

If you prefer, you can use the Reflection command language XSEND and XRECEIVE commands to perform Xmodem transfers.

Command language also offers the following Xmodem-related Reflection SET parameter:

SET XMODEM-CRC

See the Reflection *Command Language* manual for more information.

File Transfers Using FTP

The requirements for using Reflection's FTP client are described on page 376.

Your methods for performing FTP transfers depend upon your Telnet support software. If you have an earlier version of the Reflection Network Series for DOS (pre-2.0), or the TelnetManager, FTP transfers are supported using the File Transfer dialog box or Reflection command language.

If you have a later version of the Reflection Network Series (version 2.0 or above), or the Telnet software included with Reflection for DOS version 5.0, you have an additional option: Reflection's FTP interface. Before you transfer files using FTP, first start a session with an FTP server; see page 450. Continue with one of the following methods:

▲ File Transfer Dialog Box

See page 450. Using the File Transfer dialog box, you can perform single or wildcard transfers.

▲ Reflection Command Language

See page 454. With Reflection command language, the following options are supported:

- Single and wildcard transfers
- Host directory listings
- The ability to change host directories
- TENEX transfer method to exchange files with hosts that use a 9-bit byte

▲ Reflection's FTP Interface

See page 455. The FTP interface supports a set of FTP commands that offers more options than Reflection command language.

Starting a Session with an FTP Server

Configure Reflection for FTP transfers as follows:

1. Start Reflection and select CON-MGR from the Connection Type list box in the Basic Setup or Datacomm Setup dialog box.
2. At the CON-MGR prompt, use one of the following commands to begin a session with the FTP server:

```
FTP <hostname>
```

or

```
FTP <hostIPAddress>
```

See page 128 for more information on this Connection Manager command.

3. Enter your username and password at the prompts as they appear. Once your FTP session is established, your prompt looks like this:

```
ftp>
```

You can have more than one FTP session. An FTP session is not exclusively bound to a specific Reflection program; for example, an FTP session started by a R2.EXE can be resumed by a copy of R1.EXE.

Continue with one of the following FTP methods.

Using the File Transfer Dialog Box

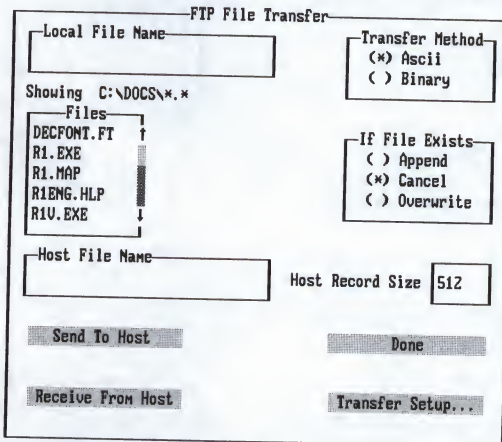
The following procedures assume that you have a session with an FTP server.

Note: If you are using version 2.0 or above of the Reflection Network Series for DOS, or the Telnet support that comes with Reflection for DOS version 5.0, the ASCII File Transfer Options Setup dialog box settings apply when your Transfer Method is ASCII. ▲

Sending Files Using FTP

To send a file using FTP and the File Transfer dialog box:

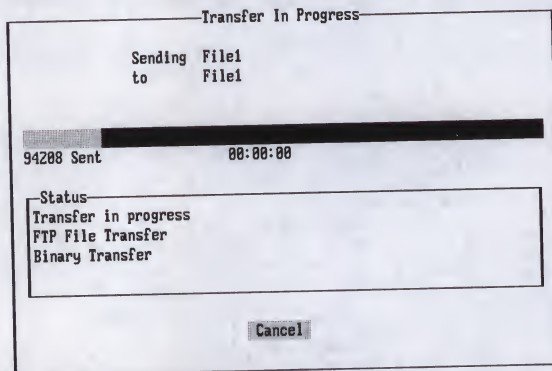
1. Select *FTP* from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Choose Transfer from the File menu to display the dialog box below. For a detailed description of all the fields in this dialog box, see page 183.



FTP File Transfer Dialog Box

3. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
4. You can optionally specify a different host file name in the Host File Name text box. See page 379 for more information.
5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.
6. To transfer the file, choose Send To Host.

7. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **Esc**.



FTP Transfer in Progress Dialog Box—Sending

When the transfer completes, the Transfer in Progress dialog box closes.

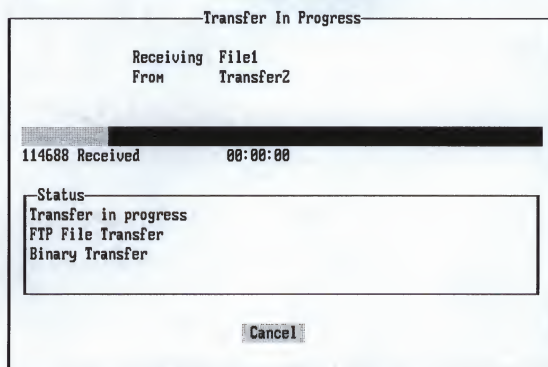
Note: The If File Exists options do not apply when sending a file to the host. ▲

Receiving Files Using FTP

To receive a file using FTP and the File Transfer dialog box:

1. Select *FTP* from the Transfer Protocol list box in the File Transfer Setup dialog box.
2. Choose Transfer from the File menu to display the FTP File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
3. Type the name of the file you want to receive in the Host File Name text box. See page 379 for more information.
4. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.
5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.
6. Specify which action you want taken if the PC file already exists: *Append*, *Cancel*, or *Overwrite*.

7. To transfer the file, choose Receive From Host.
8. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel or press **[Esc]**.



FTP Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Wildcard Transfers

The FTP protocol supports wildcard transfers to and from your FTP server using the File Transfer dialog box. When you set up a wildcard transfer, you can include wildcard characters in the File Name text box for the system that is *sending* the files. Use the wildcard characters recognized by that system:

- ▲ When transferring files from the PC to the host, use the DOS wildcard characters in the Local File Name text box.
- ▲ When transferring files from the host to the PC, use the wildcard characters appropriate for the host in the Host File Name text box.

Wildcard characters *cannot* be used in the File Name text box for the system that is receiving files. When you are transferring files from the PC to the host, leave the Host File Name text box blank. The files are transferred to your current group or directory and retain the names they had on the PC.

When you are transferring files from the host to the PC, you can optionally use the Local File Name text box to specify a non-current PC directory for the files. Host file names are truncated as needed to conform to DOS file naming conventions.

The Transfer in Progress dialog box displays the name of each file being sent or received. If an error occurs during a transfer, the remaining files that match the wildcard specification will not be transferred.

If you want Reflection to continue sending (or receiving) files following an error during a wildcard transfer, you must:

- ▲ Use Reflection command language to transfer the files (see page 454)
- ▲ Set Reflection's CONTINUE parameter to ON

See the *Reflection Command Language* manual for more information.

Within a wildcard transfer, all files transferred use the same settings for:

- ▲ Transfer Method
- ▲ If File Exists (used only when receiving files from host)

ASCII and binary transfers must be performed separately.

Using Reflection Command Language

The following assumes that you have already established a session with an FTP server (page 450).

Select Command Line from the Tools menu (or press **[Alt]-[F10]**) to display the Reflection command line. The following Reflection commands are available when you have an FTP session:

FCD—to change host directory
FDIR—for a detailed host directory
FGET—to receive a single file
FLS—for a list host files
FMGET—to receive multiple files
FMPUT—to send multiple files
FPUT—to send a single file

See the *Reflection Command Language* manual for complete command syntax.

Wildcard characters are correctly interpreted when transferring multiple files (FMGET or FMPUT); when transferring single files (FGET or FPUT), wildcard characters are treated like ordinary characters.

If you are using version 2.0 or above of the Reflection Network Series, or the Telnet support that comes with Reflection for DOS, version 5.0, the ASCII File Transfer Options Setup dialog box settings apply when your Transfer Method is *ASCII*.

Using the FTP Interface

The FTP interface is only available when you are using the Reflection Network Series, version 2.0 and above, or the Telnet support that comes with Reflection for DOS version 5.0.

Once you have established a session with an FTP server (page 450), you can use the FTP commands that follow at the `ftp>` prompt.

Command Set for FTP Interface

Use the commands that follow at the `ftp>` prompt. The FTP commands are not case sensitive. Depending on your host computer, however, directory names, file names, and other host-specific information may be case sensitive.

Each FTP command can be abbreviated to the shortest string that uniquely identifies it. For example, `MGET` can be abbreviated to `MG`, and `MPUT` can be abbreviated to `MP`.

APPEND

```
APPEND <pcfile> [to] [<hostfile>]
```

The APPEND command sends a file to the host computer, appending it to the current host file. If the host file does not exist, this command creates it, and works exactly like the PUT command.

<pcfile>

Specifies the PC file to transfer to the host.

to <hostfile>

Specifies the host file to which the PC file should be appended. If this option is omitted, the PC file is appended to a host file having the same name as the PC file. If the specified host file does not exist, it is created. The TO keyword is optional.

The following command appends a PC file to a host file of the same name:

```
APPEND WHATSNEW.DOC
```

This command appends a PC file to the specified host file:

```
APPEND WHATSNEW.DOC TO DOCUMENT.TXT
```

ASCII

ASCII

The ASCII command changes the current FTP file transfer type to ASCII. Use this transfer type to move ASCII (text) files between the host and your PC. This is the default transfer type when you start an FTP session. The ASCII File Transfer Options Setup dialog box settings apply to FTP file transfers.

BINARY

BINARY

The BINARY command changes the current FTP file transfer type to binary. Use this transfer type to move files with PC- or host-specific formatting between the host and your PC. For example, if you want to transfer a document formatted in Microsoft Word on the PC to another PC via the host, the binary type is appropriate.

CD

```
CD <directory>
```

The CD command changes the working directory on the host computer.

<directory>

Specifies a directory on the host computer. Follow the host's syntax for specifying directory names.

This command changes directories on a VAX system:

```
CD SYS$USERS:[RALPH.DOCS]
```

This command changes to the directory one level up on a VAX system:

```
CD [-]
```

The following example changes to a subdirectory of the *users* directory on a UNIX system:

```
CD /users/ralph
```

This command changes to the directory one level up from the current directory on a UNIX system:

```
CD ..
```

CLOSE

```
CLOSE
```

The CLOSE command disconnects the FTP session and returns you to the Connection Manager prompt. To return to the Connection Manager prompt without disconnecting your FTP session, suspend with **Ctrl-F8**. You can also use EXIT or QUIT as a synonym for CLOSE.

DELETE

```
DELETE <hostfile>
```

The DELETE command deletes a file on the host. This command can be abbreviated to DEL.

<hostfile>

Specifies the name of the host file to delete. The host filename can include a full directory path to the file. On some systems such as UNIX hosts, case is important when specifying directories and filenames.

This command deletes MEMO.DOC from the current host directory:

```
DELETE MEMO.DOC
```

This command deletes TUESDAY.TXT from the /users/ralph directory on a UNIX host:

```
DELETE /users/ralph/TUESDAY.TXT
```

DIR

```
DIR [<filespec>]
```

The DIR command displays a detailed listing of host files matching the given filespec. (Compare this to the LS command on page 461, which displays a less detailed listing.)

<filespec>

Specifies a directory, file, or group of files on the host. If this option is not used, the contents of the current host directory are displayed. The syntax for <filespec> varies according to your host computer.

This command displays a list of executable files in the current directory on a VAX host:

```
DIR *.EXE
```

The output from the above command might look something like this:

SYSS\$COMMON: [MANAGER]

```
RUNTHIS.EXE;1      8  26-JUL-1993 17:17 [SYSTEM] (RWED,RWED,RWED,RE)
COPYME.EXE;1       7  26-JUL-1993 17:17 [SYSTEM] (RWED,RWED,RWED,RE)
UPLOAD.EXE;1        5  26-AUG-1993 17:17 [SYSTEM] (RWED,RWED,RWED,RE)
STARTUP.EXE;2      25  17-AUG-1993 23:23 [SYSTEM] (RWED,RWED,RWED,RE)
```

EXIT

EXIT

The EXIT command disconnects the FTP session and returns you to the Connection Manager prompt. To return to the Connection Manager prompt without disconnecting your FTP session, suspend with **Ctrl-F8**. You can also use CLOSE or QUIT as a synonym for EXIT.

GET

Form 1:

GET [<hostfile>] [to] <pcfile> [append]

Form 2:

GET <pcfile> from [<hostfile>] [append]

The GET command transfers a file from the host to the PC. If a file with the same name as the one being received already exists on the PC, it is automatically overwritten. With the APPEND option, the host file is appended to the PC file.

Before using the GET command, you should use the ASCII or BINARY command to set the transfer type. Wildcards are not supported with the GET command—they are treated as ordinary characters and are assumed to be part of the filename. To transfer multiple files, use MGET instead. Form 2 is provided because it's similar to that of the FGET command in Reflection command language.

When transferring files between different types of computers, use appropriate naming conventions. For example, many UNIX systems allow host filenames containing spaces, whereas DOS does not allow spaces in filenames. Similarly, VAX filenames can have up to 39 characters on each side of the period, whereas PC filenames are limited to 8 characters to the left and 3 to the right of the period.

<hostfile>

Specifies the name of the host file to transfer to the PC. If the host filename is omitted, the host file is assumed to have the same name as the PC file.

to <pcfile>

The TO keyword is optional. Specifies the name of the PC file to be created. If no host file is given, the host file is assumed to have the same name as the PC file.

APPEND

Specifies that the host file should be appended to an existing PC file. If the PC file does not exist, it is created.

from

If you use form 2 of the GET command, the FROM keyword is required. If this keyword is omitted, form 1 is assumed.

The following (form 1) example transfers the host file MEMO.DOC from the host to the PC, giving the PC file the same name:

```
GET MEMO.DOC
```

This example transfers the VAX host file MORTGAGE.PAPERS to the PC, giving the PC file the name MORTGAGE.TXT:

```
GET MORTGAGE.PAPERS MORTGAGE.TXT
```

HELP

HELP [<command>]

HELP displays a short summary of FTP commands. You can type `HELP <command>` at the FTP prompt to see information on a specific FTP command. For a listing of FTP commands without descriptions, type `?` or `HELP ?` at the FTP prompt.

LCD

```
LCD [<directory>]
```

The LCD command changes directories on the PC (a “local” directory change).

To change directories, type the directory at the ftp> prompt, for example, type F: and press **[Enter ↵]**.

<directory>

Specifies the directory to change to. The directory syntax must follow PC directory naming conventions. If you omit the directory name, LCD displays the path for the current PC directory.

This command changes to the WRQNET directory, which is a subdirectory of the root directory:

```
LCD \WRQNET
```

LDIR

```
LDIR [<filespec>]
```

The LDIR command displays a listing of PC files matching the given filespec.

<filespec>

Specifies a directory, a file, or a group of files on the PC. If this option is not used, the contents of the current PC directory are displayed.

This command displays a listing of files in the current PC directory that have a .DOC extension:

```
LDIR *.DOC
```

LS

```
LS [<filespec>]
```

The LS command displays a simple listing of host files matching the given filespec. (Compare this to the DIR command on page 458, which displays a more detailed listing.)

<filespec>

Specifies a directory, file, or group of files on the host. If this option is not used, the contents of the current host directory are displayed.

In this example,, the names of all files in the current directory on a UNIX host are listed:

```
LS *.*
```

The listing might look something like this:

```
.cshrc  
.exrc  
.forward  
.history  
.login  
mbox  
parse.c  
setup.c  
shutdown.c  
table.c
```

MGET

Form 1:

```
MGET [<hostspec>] [to] <pcspec>
```

Form 2:

```
MGET <pcspec> from [<hostspec>]
```

The MGET command transfers one or more files matching the given filespec from the host to the PC. If a file with the same name already exists on the PC, it is overwritten. MGET differs from GET in that MGET supports multiple file transfers from the host (using host wildcard characters).

Before using the MGET command, use the ASCII or BINARY command to select the transfer type.

Form 2 is provided because it's similar to that of the FMGET command in Reflection command language.

When transferring files between different types of computers, use appropriate naming conventions. For example, many UNIX systems allow host filenames containing spaces, whereas DOS does not allow spaces in a filename. Similarly, VAX filenames can have up to 39 characters on each side of the period, whereas PC filenames are limited to 8 characters to the left and 3 characters to the right of the period.

<hostspec>

Specifies one or more host files to transfer to the PC. If this option is omitted, the host files are assumed to have the same names as the PC files.

to <pcspec>

Specifies a PC directory to receive the files, or the name of the PC file to create. The TO keyword is optional.

If a <pcspec> is given with no other options, the host filespec is assumed to be the same as the <pcspec>.

If a <hostspec> is given, the <pcspec> should be a directory path; if the <pcspec> is a filename, each file transferred from the host is written to the same PC filename, and with each transfer, the previous file received is overwritten by the new file. Also, if a <hostspec> is given, the <pcspec> cannot contain wildcard characters; you'll receive an error message when DOS tries to create a file with the wildcard character.

from

If you use form 2 of the MGET command, the FROM keyword is required. When this keyword is omitted, form 1 of MGET is assumed.

The following example transfers all files with a .DOC extension from a VAX host to the PC, placing the files in the current PC directory:

```
MGET *.DOC
```

In the following example, all files with a .DOC extension are transferred to the \DOCUMENT directory on the PC:

```
MGET *.DOC \DOCUMENT
```

MPUT

```
MPUT <pcspec> [to] [<hostspect>]
```

The MPUT command transfers one or more files matching the given filespec from the PC to the host. If a file of the same name already exists on the host, it is automatically overwritten.

MPUT differs from PUT in that MPUT supports multiple file transfers from the PC (using PC wildcard characters).

Before using the MPUT command, use the ASCII or BINARY command to set the transfer type.

When transferring files between different types of systems, make sure the files follow appropriate host naming conventions. For example, on some UNIX systems, host filenames can contain the asterisk character, whereas the asterisk in a PC filename is a wildcard character.

<pcspec>

Specifies one or more PC files to transfer to the host. Unless a valid <hostspect> is given, the files are placed in the current host directory and are given the same names as the PC files. An existing file with the same name on the host is automatically overwritten.

to <hostspect>

Specifies the name of a host file to create. The TO keyword is optional. Wildcards cannot be used.

If a <hostspect> is not used, the host files are given the same names as the PC files.

The following example transfers all files with a .DOC extension from the PC to a UNIX host, placing the files in the current host directory:

```
MPUT *.DOC
```

PUT

```
PUT <pcfile> [to] [<hostfile>]
```

The PUT command transfers a file from the PC to the host. If a file of the same name already exists on the host, it is overwritten. If you don't want to overwrite an existing file, use the APPEND command (page 455).

Before using the PUT command, use the ASCII or BINARY command to set the transfer type. Wildcards are not supported with the PUT command; to transfer multiple files using wildcards, use MPUT instead.

When transferring files between different systems, use appropriate naming conventions. For example, some UNIX systems allow host filenames containing the asterisk character, whereas an asterisk in a PC filename is a wildcard character.

<pcfile>

Specifies the name of the PC file to transfer to the host.

to <hostfile>

Specifies the name of the host file to be created. If the host filename is omitted, the host file is given the same name as the PC file. If the host file already exists, it is automatically overwritten by the new file. The TO keyword is optional.

The following example transfers the file MEMO.DOC from the PC to the host:

```
PUT MEMO.DOC
```

This example transfers the file HAPPY.ME from a PC to a VAX host, giving the VAX file the name HAPPY.BIRTHDAY:

```
PUT HAPPY.ME TO HAPPY.BIRTHDAY
```

PWD

```
PWD
```

The PWD command shows the current host directory (the "present working directory").

QUIT

QUIT

The QUIT command disconnects the FTP session and returns you to the Connection Manager prompt. To return to the Connection Manager prompt without disconnecting your FTP session, suspend the session with **(Ctrl)-(F8)**. You can also use CLOSE or EXIT as a synonym for QUIT.

QUOTE

QUOTE <string>

The QUOTE command sends a string to the host. Use QUOTE to issue commands to the FTP server that are not implemented by the Connection Manager's FTP client.

<string>

Specifies the string to send to the host. Valid strings you can use with the QUOTE command depend entirely on the FTP server; check your server documentation for details.

With many FTP servers, you can type `QUOTE HELP` for a list of commands the server recognizes. Typing `QUOTE HELP <command>` sometimes gives more detailed information about the command. Some common commands are:

Command	Meaning
CDUP	Change to the directory one up from the current directory
MKD	Make a directory
PASS	Specify a password
RMD	Remove a directory
RNFR	Specify rename-from filename
RNTO	Specify rename-to filename
XPWD	Display the current working host directory

For example, to create the subdirectory FIFE on a VAX host, you could use this command:

```
QUOTE MKD MAYBERRY$USERS:[BARNEY.FIFE]
```

TENEX

```
TENEX
```

The TENEX command changes the current FTP file transfer type to “local 8.” Use this transfer type if you’re moving files to or from a host system that uses a 9-bit byte (such as the DECsystem-20).

USER

```
USER <username>
```

The USER command initiates a user logon sequence. Use this command if the host you connect to does not automatically prompt for a username. You may also need to issue a password before the logon is accepted.

<username>

Specifies the username for initiating the host logon.

File Transfers

Using the OLD-WRQ Protocol

To transfer files using the OLD-WRQ protocol:

- ▲ The OLD-WRQ protocol host program (VAXLINK or unixlink) must reside on your host computer. See “Checking Existing Host Programs” on page 386 for help locating an OLD-WRQ program on your host.
- ▲ Reflection must be configured to do OLD-WRQ protocol transfers. See the procedure below.

Configuring Reflection for the OLD-WRQ Protocol

Configure Reflection to use the OLD-WRQ protocol as follows:

1. Choose Transfer Setup from the File menu.
2. Select *OLD-WRQ* from the Transfer Protocol list box to display the OLD-WRQ Protocol Settings. For a detailed description of these settings, see page 215.
3. Use the following Host Startup Sequences:

VAX/VMS	<i>RUN VAXLINK</i>
UNIX	<i>unixlink</i>

4. Choose OK.

Host Startup Sequence

If your transfers fail with one of the following errors, your Host Startup Sequence is not correct for your host program:

“No host response”
“Timeout (receive)”

Find out how to execute the OLD-WRQ host program at your host prompt. Use the same string in the Host Startup Sequence box.

Sending Files Using the OLD-WRQ Protocol

Send files using the OLD-WRQ protocol as follows:

1. Start Reflection, establish a connection, and log on to your host computer. Be sure your logon enables you to read and write files.
2. Choose Transfer from the File menu to display the dialog box below. For a detailed description of all the fields in this dialog box, see page 183.

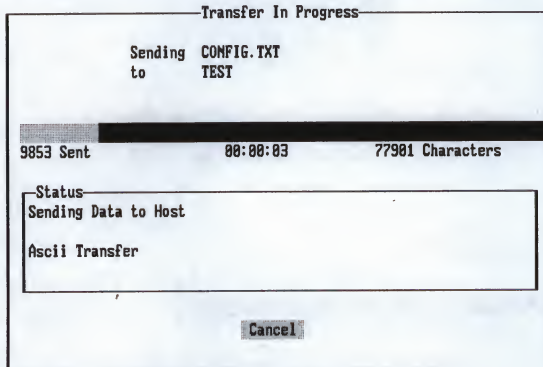
OLD-WRQ File Transfer Dialog Box

3. Select the file you want to send from the Files list box, or type the name in the Local File Name text box. See page 378 for more information.
4. You can optionally specify a different host file name in the Host File Name text box. See page 379 for more information.

Also see page 472 for host file name switches that can be appended to the host file name.

5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.
6. Specify which action you want taken if the host file already exists: *Append*, *Cancel*, or *Overwrite*.
7. Enter a host record size if your host application has certain requirements.

8. To transfer the file, choose Send To Host.
9. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel.



OLD-WRQ Transfer in Progress Dialog Box—Sending

When the transfer completes, the Transfer in Progress dialog box closes.

Receiving Files Using the OLD-WRQ Protocol

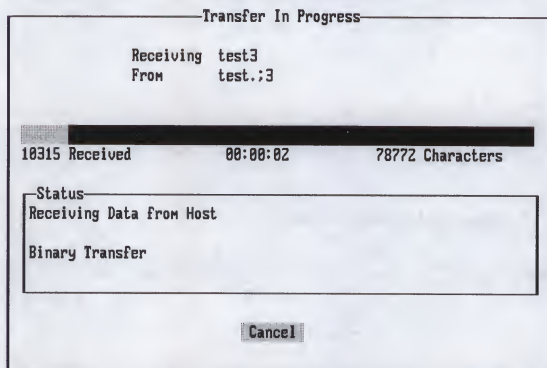
Receive files using the OLD-WRQ protocol as follows:

1. Start Reflection, establish a connection and log on to your host computer. Be sure your logon enables you to read and write files.
2. Choose Transfer from the File menu to display OLD-WRQ File Transfer dialog box. For a detailed description of all the fields in this dialog box, see page 183.
3. Type the name of the file you want to receive in the Host File Name text box. See page 379 for more information.

Also see page 472 for host file name switches that can be appended to the host file name.

4. You can optionally specify a different local file name by selecting a file from the Files list box or typing a name in the Local File Name text box. See page 378 for more information.

5. Select the appropriate Transfer Method for the file you are transferring: *ASCII* or *Binary*.
6. Specify which action you want taken if the PC file already exists: *Append*, *Cancel*, or *Overwrite*.
7. To transfer the file, choose Receive From Host.
8. The Transfer in Progress dialog box provides information on the progress of your transfer. To cancel the transfer, choose Cancel.



OLD-WRQ Transfer in Progress Dialog Box—Receiving

When the transfer completes, the Transfer in Progress dialog box closes.

Host File Name Switches

For transfers to a VMS system, the OLD-WRQ protocol supports the following the host file name switches:

/C Submit Files to Batch Queue

Applies to ASCII transfer to the host only. Submits the file to the batch queue (SYS\$BATCH) upon completion of the transfer. Files are deleted on the host after they have been submitted.

/D DECDx Format Files

Applies to binary file transfer only. /D transfers files in DECDx format between the VAX and PC.

/F Fixed Host Record Size

The default format for binary transfer using *OLD-WRQ* is variable. Use the /F switch to specify fixed-length binary files.

/I Image Transfer Method

The /I switch specifies an image file transfer. To maintain an exact copy of your file, use the /I switch with the same protocol (*OLD-WRQ* or *WRQ*) for sending and receiving the file—don't send it with one protocol and then receive it with the other.

/S Spool Files to Printer

ASCII file transfer to host only. Submits the file to the print queue (SYS\$PRINT) upon completion of the transfer. Files are deleted on the host after they have been submitted.

/W Block Mode Binary Transfer

This switch supports the block mode binary transfer required for files created by applications such as the DOS and VMS versions of Lotus 1-2-3 and WordPerfect.

OLD-WRQ Protocol Command Language

If you prefer, you can use the Reflection command language *SEND* (old) and *RECEIVE* (old) commands to perform *OLD-WRQ* transfers. Command language also offers the following *OLD-WRQ*-related Reflection SET parameters:

- SET BLOCK-SIZE
- SET HOST-START-OLD
- SET HOST-STARTUP
- SET TRANSFER-HOST-RECORD-SIZE

See the Reflection *Command Language* manual for more information.

Maintaining Two Host Startup Sequences

Existing command files and procedures that specify VAXLINK by name can be changed to use the new file transfer program. In most cases, changing the host startup sequence to VAXLINK2 and making any of the modifications covered above are the only changes required. However, some host-based procedures may need to be upgraded so that the host file transfer program's name is based on the current setting defined by Reflection.

DEMO1.DCL, distributed with Reflection, is a sample Digital command file that illustrates how a host-based transfer procedure can query the host startup sequence.

If you need to support startup sequences for both protocols, existing command files can be changed so that SET HOST-STARTUP is updated from the value saved in SET HOST-START-OLD or SET HOST-START-WRQ. See the *Reflection Command Language* manual for more information. If you use an older configuration file (pre-version 4.0), the File Transfer dialog box will show the new defaults (the Transfer Protocol list box, for instance, will be WRQ, not OLD-WRQ).

Note: Do not rename your new host file transfer program (VAXLINK2 or UNXLINK2) to the old filename (VAXLINK or UNIXLINK). This could cause confusion for users with pre-4.0 versions of Reflection.

In addition, the message "Host software requires OLD-WRQ transfer protocol" is displayed if your startup sequence specifies VAXLINK or UNIXLINK and your selected protocol is WRQ. ▲

Troubleshooting

This section offers troubleshooting solutions to general problems, provides information on resolving file transfer problems, and includes an alphabetical list of screen and error messages.

If you cannot resolve your problems, call the Walker Richer & Quinn technical support team. To receive technical support, you must be a licensed user of Reflection—just send in your completed registration card.

In the U.S.A., support hours are from 6 A.M. to 5 P.M. Pacific time, Monday through Friday. Call (206) 217-7000. If you need to fax information, the number is (206) 217-9492.

Outside the U.S.A., contact your WRQ authorized distributor. In Europe, call +31.(0)70.375.11.00 for the name of the distributor nearest you. In other countries, call (206) 217-7100 and ask the International Department for the name of the distributor nearest you.

There are additional support channels available electronically:

- ▲ In the U.S., use your modem to dial into WRQ's BBS: call 206-217-0145. There are four dial-in lines at up to 19,200 bps.
- ▲ In Europe, use your modem to dial into WRQ's satellite BBS: call +31.(0)70.356.2725. There is one dial-in line at up to 9600 bps.
- ▲ Connect via the Internet to the BBS: `support@wrq.com`
- ▲ Connect over the BBS Telnet gateway: `bbs.wrq.com`
- ▲ Connect to the WRQ Reflection Forum over CompuServe: enter GO REFLECTION or GO WRQFORUM
- ▲ Get files from WRQ's anonymous FTP site at `anon.wrq.com`. (Files from the WRQ BBS are in the `/bbsfiles` directory.)
- ▲ Request WRQ Technical Notes by fax at (206) 217-9575.

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Solving General Problems

This chapter discusses different troubleshooting techniques to try if you have problems with your host connection, the display, memory or with terminal types.

No Response from Host

If nothing is echoed on the screen when you type characters while connected to a host computer, check the following possible causes of the problem:

- ▲ Check your PC. At the DOS prompt, type `COMCHECK`. If the program reports a problem, a change must be made to your serial cards. Make sure that you do not have two cards both configured as COM1 or COM2. For more information about troubleshooting serial ports see page 83 and the *Reflection User Guide*.
- ▲ For serial communications, verify the physical connection. If possible, connect a terminal with the same cable you use to connect the PC. (A gender changer is usually necessary due to the male serial port on the PC.) If the terminal works, the physical connection is usually correct. If not, see page 80, "Cables for a Direct Connection," for cable diagrams. Ensure that the cable and gender changer (if used) both have straight-through pin connections (2-2, 3-3, etc.)
- ▲ Is Reflection in remote mode? In the General Setup dialog box, verify that the Online check box is selected (meaning Reflection is in remote mode). If this check box is cleared, Reflection does not transmit anything to the host.
- ▲ Check Connection Type in the Datacomm Setup dialog box. You may be trying to use the wrong COM port or have the wrong network configured.
- ▲ On a serial connection, make sure Baud Rate in the Datacomm Setup dialog box is correctly configured. If the host computer is a VAX, use the default values for all other datacomm fields.
- ▲ If you have a serial connection, choose Datacomm Statistics from the Tools menu (or press `[Alt]-[F5]`) to open the Datacomm Statistics dialog box. Are all the fields 0? Any fields that are non-zero indicate some problem in data transmission or reception. See page 481 for a description of errors reported by the Datacomm Statistics dialog box.

Problems with External Modems

If you have an external modem and cannot establish a connection, use the modem's indicator lights to help diagnose the problem. If you have an indicator marked SD (send data) or TD (transmit data), this light should flash each time you press a key.

If an indicator marked RD (receive data) flashes after you press a key, this means that an echo is coming back from the modem. If the SD light flashes but the RD does not, then the problem probably lies with the modem. However, this could also mean that the host computer is not echoing, either because it is not accepting input or it's operating in half-duplex mode.

Pacing Data Transfer

If Reflection transmits data as fast as it can, the host computer may not be able to keep pace. If you are using the WRQ protocol, experiment with setting a higher Line Transmit Delay in the Advanced Datacomm Setup dialog box. For other protocols, set Character Transmit Delay, in the same dialog box, to 3. Transmit Pacing should be set to XON/XOFF (the default).

If you are using Reflection 4 and you start WordPerfect on the VAX, you may hear a series of beeps. These beeps mean that the host is receiving more information than it can process. To synchronize the host and the terminal (Reflection), enter the following command at the host prompt:

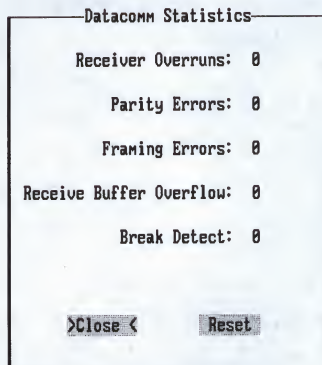
```
SET TERMINAL /HOSTSYNC
```

This setting is also recommended in the WordPerfect documentation. When the /HOSTSYNC qualifier is used and when the host's input buffer is nearly full, the host attempts to stop the terminal (Reflection) from transmitting more data by sending an XOFF. When its input buffer is ready for more data, it sends an XON. To set Reflection back to the default of no host synchronization, enter:

```
SET TERMINAL /NOHOSTSYNC
```


Analyzing Datacomm Errors

If your protocol choice is *WRQ* or *OLD-WRQ* in a non-network environment, you can use the Datacomm Statistics dialog box to troubleshoot your connection. Whenever the datacomm hardware (the UART) detects a data communications error, Reflection displays a DEL character on the screen (the Δ is the IBM PC's symbol for the ASCII delete character, decimal 127) and adds 1 to the appropriate error counter in the dialog box. Choose Datacomm Statistics from the Tools menu (or press **(Alt)-(F5)**) to open the Datacomm Statistics dialog box.



Datacomm Statistics Dialog Box

Receiver Overruns

Each time Reflection receives a character from the host computer, it must read that character before another character is received; if it does not, a *receiver overrun* error occurs. This is caused by memory-resident programs or device drivers. Rename your AUTOEXEC.BAT and CONFIG.SYS files (to A.BAT and C.SYS, for instance) and reboot your PC. If this solves the problem, you may wish to reinstate AUTOEXEC.BAT and CONFIG.SYS one line at a time, until the source of the problem is found. The idea is to narrow the problem down to one or two resident programs or drivers, and then to remove only those. PATH and PROMPT statements cause no problems.

Parity Errors

This number is only increased if the Check Parity check box in the Datacomm Statistics dialog box is selected. Parity errors are much more likely to occur with a modem connection than with a direct connection. Make sure Reflection's parity set-

ting matches that of the host or intermediary device. You should normally have the Check Parity check box cleared.

Framing Errors

A framing error indicates that the baud rate of the PC is different from that of the host computer. This usually occurs with very long or noisy cables between the PC and the host.

Receive Buffer Overflow

Reflection has a buffer in which characters received from the host computer are held until they can be processed. If Reflection cannot keep up with the incoming data, the buffer fills up and an overflow occurs. Try setting Receive Pacing in the Advanced Datacomm Setup dialog box to to XON/XOFF (the default). If this does not solve the problem, you have to find out what kind of flow control the host accepts.

Break Detect

This counter is incremented whenever a break (a 200 millisecond signal) is detected. Breaks are usually an indication that the connection to the host is bad—either the phone lines are noisy or the cables are bad. It could also mean that the communication line is set at the wrong baud rate.

Display Problems

There are a number of steps you can take if your Reflection or DOS screen appears garbled.

If your Reflection screen is garbled:

- ▲ Reset the video with **Alt**-**=**. This reinitializes the video card and redisplay the screen. Only text images are affected, not ReGIS or Tektronix images.

See page 60 for information. The escape sequence equivalent is `ESC&OD`.

- ▲ If you are using Reflection 4 and you lose your graphics image altogether when you toggle in and out of Reflection, or in and out of graphics mode, you may not be saving enough bit planes.

To save all of the colors in a ReGIS image, # Bit Planes Saved in the ReGIS Seup dialog box should be set to 4. To save a Tektronix image, set the value of this field to at least 1.

For more information on this dialog box option, see page 260.

If your DOS screen is garbled:

- ▲ First try using /S when you start Reflection. This does a “quick” save and restore of an EGA or VGA graphics image (such as in Microsoft Word) when you toggle in and out of Reflection with the hot-key. See page 35 for additional information.
- ▲ Use /S1 instead of /S if you find that /S does not completely save and restore an EGA or VGA graphics image when you toggle in and out of Reflection. Using this startup switch saves your graphics image to a temporary file. See page 35 for more information.
- ▲ The /Z startup switch is for VGAs only. It saves the VGA palette/video configuration when hot-keying from an application to Reflection. Used in combination with /S, /Z prevents the blink/bright irregularities that can occur when you use the hot-key to toggle to an application like Microsoft Word from Reflection. It can also be used in combination with /S1.

The /Z switch can be used in cases when /S cannot be used. See page 36 for more information.

- ▲ The SET VIDEO-BUFFER command specifies the size of a buffer for saving the screen image of a program run while Reflection is in the background. This preserves the screen image of the program as you toggle between it and Reflection with the hot-key. Space for the buffer is taken from the value of Actual Display Memory in the Advanced Display Setup dialog box, when the hot-key is first used, and is represented by the value *DEFAULT*.

You may need to set VIDEO-BUFFER to 16K or higher to save the screen image of your DOS application. This SET parameter should not be used in conjunction with the /S, /S1, or /Z switches.

Sharing Violation or Fatal Overlay Errors

If you are using DOS 4.0x and a hard disk with any partitions larger than 32 megabytes, you are probably using SHARE, and Reflection must be a read-only file. The Setup program automatically makes Reflection read-only. If this is not set correctly, you will see a DOS error message about a “Sharing violation” or the Reflection message “Fatal error attempting to load overlay.”

To make the Reflection file *read-only*, type the following at the DOS prompt:

```
ATTRIB +R R<n>.EXE
```

The read-only attribute is lost when a file is copied. Also, you cannot delete a read-only file until you change the attribute:

```
ATTRIB -R R<n>.EXE
```

Not Enough Memory

A Reflection error message about memory limitations means that your computer does not have enough memory or DOS has allocated some memory to another program. See page 335 for tips on conserving memory.

If you hot-key out of Reflection and then load a program that must stay in memory, your computer’s memory will be “fragmented”—you may not have enough memory to run another application even after you exit Reflection.

For example, if you are on a Novell network, load your network software before starting Reflection: do not load IPX or NET<n> when Reflection is in the background.

Switching between ANSI and VT Terminal Types

The Mode list box in the General Setup dialog box can be set to one of a series of VT or ANSI terminals. These are listed on page 230. This section explains in more detail what happens when you switch between ANSI and VT modes.

If you toggle into or out of either of these modes (in this setup dialog box or using the SET TERMINAL-TYPE command), then a number of Setup items are reset to their defaults except Language, 132 Column Adapter, and Hot-Key. Also, any customized keyboard mapping you have does not remain in effect when you change your terminal type between VT and ANSI. If you want to keep configuration settings and keyboard mappings when switching terminal types, create two different configuration files—one for VT emulation and one for ANSI emulation. You can then use the LOAD command on the Reflection command line to switch to the other emulation; for example, `LOAD ANSI.CFG`.

See page 230 for a list of settings that have different default values depending on whether the Mode list box is set to SCO ANSI or BBS ANSI, or a VT choice.

Solving File Transfer Problems

This chapter provides solutions to some problems you may encounter when transferring files between Reflection and the host.

Using Predefined Settings

Most file transfer problems may be solved by choosing a Predefined Setting in the File Transfer Setup dialog box as explained on page 191. Each predefined value also has a troubleshooting counterpart; try that setting if your first choice does not work.

Problems with Host File Transfer Programs

If VAXLINK2 (the host file transfer program for VMS hosts), or unxlink2 (for UNIX systems) is not compatible with the version of Reflection you are running, you'll receive the message "Incompatible host software-you must do an upload." Upload the current version of the host program as explained on page 381.

If you have trouble uploading the host program using the automated command files, try uploading the files manually; this is described next.

Problems Uploading VAXLINK2

Uploading VAXLINK2 is automated by UPLOADVX.RCL; this command file uploads the executable image of Walker Richer & Quinn's VMS file transfer program. If you have problems using this command file, you may be able to upload VAXLINK2 using VMS KERMIT-32, if the program is present on your host.

Uploading VAXLINK2 Using KERMIT-32

To upload VAXLINK2 using VMS KERMIT-32:

1. Make sure you have VMS KERMIT-32 on your host; it must be version 3.3.011 or newer (the version number is displayed when you start the program).
2. Start the host program (this is done typically by typing `KERMIT`).
3. At the KERMIT-32 host prompt, type the following two commands (pressing `Enter`  after each one):

```
SET FILE TYPE FIXED
RECEIVE
```

4. Execute the following on the Reflection command line:

```
KSEND VAXLINK2.EXE BINARY
```

5. When the transfer completes, exit the KERMIT-32 program by typing `QUIT`.

A file called `VAXLINK2.EXE` is in your current directory on the VMS system. Now you can transfer files using the `WRQ` protocol, as described on page 399.

Problems Uploading UNXLINK2

Uploading `UNXLINK2` is automated by `UPLOADUX.RCL`; this command file uploads the necessary files of Walker Richer & Quinn's UNIX file transfer program. If you have problems using this command file, you may be able to upload `UNXLINK2` using Kermit, if the program is present on your host. Then, you must compile the host files.

To upload `unxlink2` source file using Kermit:

1. Make sure you have Kermit on your host.
2. Start the host program (this is done typically by typing `kermit` at the UNIX prompt).
3. At the Kermit prompt, type:

```
server
```

4. Enter the following command on the Reflection command line to send the files UNXLINK2.C and UNXXFER2.C to the host:

```
KSEND unx*.c
```

Naming is case sensitive on UNIX hosts, therefore the wildcard file name must be entered in lowercase so that the resulting UNIX files are named in lowercase.

5. When the transfer is complete, exit the Kermit server mode by typing `KFINISH` on the Reflection command line.
6. Exit Kermit by typing `exit` at the Kermit prompt.

The Transfer in Progress dialog box will display information concerning the progress of each upload. If the uploads are successful, you will find the two source files in your current directory on the UNIX host. Compile these two files to create the host program `unxlink2` as explained next.

Using a 'C' Compiler to Create UNXLINK2

After transferring the two files in the steps above to the host, the next step is to compile them using UNIX commands. Which command you should enter depends on what version of the UNIX operating system you're running.

- ▲ If you're using UNIX System 5, enter this command at the host prompt:

```
cc -DSYSTEM5 -o unxlink2 unxlink2.c unxxfer2.c
```

Since many UNIX systems (including SCO/Xenix) are based on System 5, use this command if you do not know what version of UNIX you have.

- ▲ For all other UNIX systems, use this command:

```
cc -o unxlink2 unxlink2.c unxxfer2.c
```

File Transfer Problems

To perform file transfers to a host, a host version of the file transfer program must be available on the host to work with Reflection. Host programs are supplied with Reflection for transferring files to VMS and UNIX hosts. For information about checking what version of the transfer program is on the host, see page 386 for VMS, and page 389 for UNIX.

If you know that the most current version of the transfer program is installed on the host but file transfers are not working, change the following and try again:

1. Restart Reflection.
2. Log on to your host.
3. Choose Transfer Setup from the File menu.
4. In the File Transfer Setup dialog box, choose Predefined Settings.
5. Choose the *Troubleshooting WRQ Protocol* that matches your host (for example, *Troubleshooting WRQ Protocol to VMS* if you are logged on to a VMS host) and choose OK.
6. Choose OK in response to any parameters outside of the File Transfer Setup dialog box that are changing.
7. Try the transfer again.

No Host Response for Transfer

If you get the message “Host doesn’t respond” when initiating a transfer, this means that the host file transfer program could not be executed. Review the following situations that cause this message to appear:

- ▲ You did not have a host prompt when starting the transfer. First, try manually typing the startup sequence from your host prompt. If this works, check the syntax for the Host Startup Sequence in the File Transfer Setup dialog box to make sure it matches what you just typed. The host program was not uploaded; see page 381.
- ▲ Another program is running on the host, so the startup sequence could not be executed. Wait until the other program completes, then try again.
- ▲ Your Host Startup Sequence is incorrect. See the next section.

Changing the Host Startup Sequence

If you're having trouble transferring files, make sure you have the correct Host Start-up Sequence in the File Transfer Setup dialog box:

- ▲ For VAX/VMS transfers, if you defined VAXLINK2 as a foreign command using the procedure on page 411 and you cannot transfer files, make sure the word "RUN" is not part of the host startup sequence. The sequence should simply read VAXLINK2.
- ▲ For UNIX transfers, first make sure the host startup sequence reads *unxlink2* (this must be in lowercase letters). Then, type *unxlink2 -h* at the UNIX host prompt. If you receive the error message "Command not found" and the file *unxlink2* is located in the current UNIX directory, change your host startup sequence to *./unxlink2*.

File Transfer Timeout

When transferring a file, if Reflection and the host do not respond to each other within a certain amount of time, the file transfer will *time out* with the message "Transfer link failed."

The following circumstances are possible:

- ▲ You are transferring a file and Reflection times out repeatedly while waiting for a response from the host. If the host is really sending data, but slowly, you might try increasing the Receive Timeout value in the File Transfer Setup dialog box (discussed in more detail, below).
- ▲ You may have an intermediary device (multiplexer) that is trying to perform flow control or to filter out certain characters. Select the appropriate Troubleshooting protocol (see page 191) from the file transfer predefined settings and try again.

Receive Timeouts

The value of Receive Timeout (page 191) determines the maximum amount of time that Reflection should wait for a packet of data or an acknowledgement from the host when receiving a file; by default, this is set to 15 seconds. If there is no response within the timeout period, data is assumed to be lost and Reflection requests that the data be sent again. Consecutive timeouts can cause the file transfer to fail.

If you know that your host computer responds quickly to data requests, but your host connection is prone to transmission errors, try decreasing the value of Receive Timeout in the File Transfer Setup dialog box. If noise on the data line requires a data packet to be retransmitted, decreasing this value causes Reflection to wait less time before timing out from the error, which in turn speeds up transfers.

Vax Process Quotas

You may not be able to run the VMS file transfer host program if the process quotas on your VMS are not set high enough. For example, you may receive the message "File access failed" or "Exceeded quotas." VMS won't tell you which quotas you exceeded (for security reasons), but following are the recommended minimums:

ASTLM	24
BIOLM	18
DIOLM	18
BYTLM	16000
Buffered I/O byte count quota	4096

To display process quotas, type the following DCL command at the host prompt:

```
SHOW PROCESS/QUOTAS
```

For example, to set the byte limit quota (which is the Buffered I/O limit) to 16000, modify the user authorization file (UAF) with the AUTHORIZE utility.

Note: Changing process quotas requires certain access privileges. Your system manager may need to increase your quotas for you. ▲

Once you are in the AUTHORIZE utility, the syntax is as follows:

```
MODIFY username/BYTLM=nnnn
```

To set the byte limit for HIMRT to 16000, for example, use:

```
MODIFY HIMRT/BYTLM=16000
```

The UAF file is updated when you exit AUTHORIZE and the new quota values take affect the next time you log in.

File Transfers over High-Speed Modems

If you're experiencing trouble transferring files over a high-speed modem, first try disabling Reflection's data compression. To do this, execute the following command from Reflection's command line:

```
SET COMPRESSION NONE
```

If this setting does not resolve your problem, then try turning off the modem's data compression. This can be done using a modem initialization string that you enter in Reflection's Modem Dialer Setup dialog box (see page 303).

File Transfers When Running OS/2

If you have a serial host connection and experience problems with file transfers, reduce the Frame Size in the File Transfer Setup dialog box to 256 or lower (see page 205).

Creating Trace Files and Log Files

If you're experiencing file transfer problems while using the WRQ protocol, Walker Richer & Quinn's technical support staff may request that you "capture" a trace file that logs file transfer activity.

While the contents of these trace files—a cryptic record of data communications activity that occurs during the transfer—will not make much sense to you, the files are of great assistance to a WRQ technical support person experienced in reading file transfer trace files.

To capture all data coming from the host or going to the host (regardless of the transfer protocol you are using), use the command `SET TRACE YES`. The Reflection *Command Language* manual provides examples of this technique.

VMS File Transfer Log

To capture file transfer activity to a VMS host log file when using one of Reflection's protocols (WRQ or Old-WRQ), go through the following steps:

1. Define VAXLINK2 or VAXLINK as a foreign command (page 409).
2. Append `L` to the Host Startup Sequence in the File Transfer Setup dialog box (page 200).
3. Perform the transfer you are having trouble with.

A log file containing terminal-based data communications is created in the current host directory. The log file name is either `WRQLOG` (VAXLINK2) or `VLINK_STAT.LOG` (VAXLINK).

Fast File Transfer Traces

If you are using VAXLINK2 over a LAT connection, Reflection's "fast file transfer" is (by default) in effect and no log file can be created. You can disable fast file transfer with a command (type `SET FAST-FILE-XFER NO` on the Reflection command line). A log file can then be created, but fast file transfer is not in effect.

UNIX File Transfer Log

When you are using UNXLINK2 (the host program that corresponds to the WRQ protocol), you can have a file transfer log file created on the host by adding a parameter to the Host Startup Sequence. Add `-L` to the sequence as follows:

```
unxlink2 -L
```

(The case of the letter `L` does not matter, unlike the lowercase requirement of the Host Startup Sequence.) File transfer activity is logged to a host file called `WRQLOG`.

Intermediary Systems

File transfer problems often occur when intermediary communication hardware or software systems exist between the PC and a host computer. Typical examples are connections over public data networks and multiplexers.

The reason these intermediary systems sometimes cause transfer problems is that Reflection's file transfer normally sends binary characters during a file transfer (even when using the ASCII transfer method), and an intermediary system may be filtering out these characters. If you have trouble with file transfers using Reflection, and an intermediary system exists between your PC and the host computer, using the 7-bit protocol may solve the problem (choose Predefined Settings from the File Transfer Setup dialog box, and select one of the *Troubleshooting* settings that puts you in 7-bit mode).

With the 7-bit protocol, each data character (including binary data) is modified to ensure that it is a non-control (printable) ASCII character. This data modification is reversed by the recipient (host computer or PC), so that any kind of data can be transmitted transparently to the user. In addition, this method works with many configured line protocols and therefore can be used with most intermediaries. The 7-bit protocol does slow down transmission.

Settings Guidelines

If, after using a *Troubleshooting* predefined setting, you continue to have problems with file transfers using the WRQ protocol, use the guidelines that follow. These suggestions do, however, slow down the speed of transfer. Once you are able to successfully transfer a file, experiment with the settings one at a time and determine which ones are relevant to your environment.

- ▲ The default start and end characters for data packets are ^B and ^C. Alternate characters are required if these characters do not remain intact when passed through intermediate devices such as multiplexers and error-correcting modems. Change the start and end of frame characters from the Reflection command line:

```
SET TRANSFER-START-CHAR " ("
SET TRANSFER-END-CHAR " ) "
```


- ▲ Lower the Frame Size in the File Transfer Setup dialog box. If you still experience problems, experiment with a smaller size; the minimum is 32.
- ▲ If you are in an environment that does not use a host prompt (the value of the SET parameter HOST-PROMPT is "^@", the default), increase the value of Line Transmit Delay in the Advanced Datacomm Setup dialog box.
- ▲ If you are connected to a device that cannot handle high baud rates, you may need to raise Character Transmit Delay in the Advanced Datacomm Setup dialog box. If this does not help, set the delay back to 0.
- ▲ If you are using VAXLINK2 or UNXLINK2, you can lower the transfer window size. Enter 1 in the Window Size text box (see page 205).

Zmodem Transfer Problems

If you are unable to transfer files using the Zmodem protocol, typically this can be corrected by changing the Transfer Method to *Binary*. You can do this in either the File Transfer Setup dialog box (which would set the default transfer method), or each time you perform a transfer in the WRQ File Transfer dialog box.

Zmodem Transfer Errors

If you're transferring files using the Zmodem protocol and receive the message "Unable to communicate with remote system," first check to see if the Zmodem program on the host is a public domain version. To do this, type the command that starts a Zmodem download at the host prompt; this is typically *sz*. The resulting output produces a syntax listing; if you see "For Use with Omen Technology Products," then the version of Zmodem you're attempting to use will not work with Reflection's public-domain implementation of Zmodem.

Kermit Transfer Problems

If you are unable to transfer files using the Kermit protocol, typically this can be corrected by changing the Transfer Method to *Binary*. You can do this in either the File Transfer Setup dialog box (which would set the default transfer method), or each time you perform a transfer in the WRQ File Transfer dialog box.

Parity Settings with Kermit

Both the host and the PC determine which parity Kermit uses during file transfers. If both are able to operate in 8-bit mode, Reflection transfers in 8-bit mode. If Reflection's Parity setting is other than 8-bit (page 223), 7-bit mode is used. Problems occur if both systems can operate in 8-bit mode, but an intermediary, connecting system can only operate in 7-bit mode. You must set the parity to 7/O's in this case to force Kermit to operate in 7-bit mode.

PC File Information

If you do not know which type of PC file you're about to transfer to the host, use the FILEINFO utility (copied by the Setup program to your Reflection directory). This utility tells you:

- ▲ Whether the file contains any characters outside of the ASCII set (characters with a decimal value higher than 127) and is therefore binary
- ▲ If an ASCII file contains a ^Z as an end-of-file indicator

See page 350 for information on how to use this utility.

Screen and Error Messages

The following pages explain screen and error messages that may appear during Reflection operation. The messages are listed in alphabetical order.

132-column adapter must be configured for 132 columns

You selected 132 Columns in the Display Setup dialog box without a 132-column adapter installed. If you do not have an adapter, in Reflection 2 you can use the /B132 startup switch, and in Reflection 4 you can toggle to graphics mode with **[Alt]-[V]**, before choosing the 132 Columns option.

Aborted by host

A file transfer was aborted by the host computer.

Aborted by user

A file transfer was aborted by the user.

Abort or retry?

When an error is encountered, you are requested to either abort or retry the operation. If you are able to fix the problem (for instance, by inserting the correct disk in the drive or turning on the printer), retry the operation.

Access denied

You cannot write to a read-only protected file.

Additional parameter(s) required

CTERM command interpreter syntax error. A description of the CTERM interface begins on page 110.

Ambiguous command verb

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Ambiguous keyword

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Attach to Comm Exec server failed

Connection Manager error. Your attempt to connect to a Communications Executive server using NetWare for LAT failed.

Bad character in node name

AdvanceNet message. The the node name (name of host computer) has a syntax error. An illegal character (a control character) was entered in the network node name given.

Bad field length in node name

AdvanceNet message. The name entered as the network node name is too long. Check it and reenter the name. The node name has 3 fields, each of which is restricted to 15 characters.

Bad or missing command file password

You attempted to invoke an encrypted command file without a password, or you entered a password incorrectly. The syntax is: <filespec>[/<password>]. The slash (/) is required.

Cannot attach, all circuits in use, detach first

The program NLAT.EXE is not configured to support additional Communications Executive server connections from your PC. Use the DETACH command to end one of your established server connections. You can configure NLAT to support additional server connections (up to eight) by loading with the /CKT:<n> switch.

Cannot attach, all server licenses are in use

Your NetWare for LAT license specifies the number of concurrent connections allowed to a Communications Executive server. Another user at your site must detach from the server before you will be able to make a connection. Contact your Novell representative concerning your NetWare for LAT license.

Cannot find host

Connection Manager error. You are using a protocol that requires a host name; the name or IP address you specified cannot be located. See your Reflection Network Series documentation for more information.

Cannot resume session

Connection Manager error. You are attempting to resume a session that is already attached to a different copy of Reflection, or that session does not exist.

Can't find R?.EXE

The Reflection executable program may have been damaged. Run the Setup program again to get the program off of your product disks.

Caps Lock state previously defined

KEYCOMP error message. The initial state of Caps Lock can only be defined once in a keyboard mapping file.

Command interpreter unavailable!

You may receive this message if you try to connect to your host computer using CTERM as your datacomm choice. This message sounds like a DOS error message, but it does not refer to COMMAND.COM.

The command interpreter in question is a driver called CTERMCI.EXE that is included on your product disks. Load CTERMCI.EXE after CTERM.EXE is loaded to correct the problem.

Communications driver software not found

Reflection can't find the Reflection Network Series or LAN software; it must be installed before you start Reflection.

If your datacomm choice is *AT&T*, you must install the NetBIOS interface before you start Reflection. For *EICON*, *IBM ACS*, and *INT-14*, the interrupt 14 interface must be installed before you start Reflection. In the case of *HP-TELNT*, *TELNET.SYS* must be run before you start Reflection.

You may also see another message: "You must load your network software, including CONMGR.EXE, before starting Windows."

For LAT connections (including *PATHWORKS*), Reflection can automatically load the LAT support programs CONMGR and LATMGR if Windows is not used. But if you are running Reflection in a DOS window, CONMGR and LATMGR cannot be loaded automatically—you must run them from DOS before starting Windows.

Connected

A CTERM command interpreter session status response indicating that the connection to the host is active.

Connection failure

Reflection Network Series message. The host you specified could not be reached. A router on the network may not be handling the connection correctly.

Connection refused by host

Reflection Network Series message. There may be a resource limit on the host to which you are trying to connect, or the host may have this service disabled.

Connection timed out

Reflection Network Series message. The host has been identified, but there has been no response. The host may not be available.

Could not create DOS file

This error message indicates that an output file could not be created on the PC's disk.

This can happen at the start of a file transfer from the host to the PC. You will also see this error if Reflection tries to save a temporary file (a state save or session state file) to a directory that cannot be found or is full. Check the following:

- ▲ If the error occurs during a file transfer, is there enough room on the destination drive, and does the destination directory exist?
- ▲ If the error occurs when you hot-key or are managing network sessions, is there enough room on the hard drive or RAM drive to which the RTMP environment variable points?
- ▲ Are you running Reflection on a server where you do not have write access?

Run Reflection's Setup program and select "Configure Reflection" to set up a directory or RAM drive for temporary files. Also see "Setting the Directory for Temporary Files" on page 41 for more information.

Critical DOS error #<n>

Check the *DOS Technical Reference* for the explanation of the error number indicated.

CTERM connect error

CTERM command interpreter CONNECT command. This message is displayed if one of the following has occurred:

- ▲ The service you are trying to connect to is not in the service directory.
- ▲ The CTERM driver was unable to allocate the resources for a new connection.

CTERM session unavailable

The session specified with the CONNECT or RESUME command is in use by another command interpreter session or is not active.

Current

CTERM command interpreter session status response. Indicates that a given session is your current one.

Data error (CRC)

DOS error message. Your floppy disk is probably damaged.

DECFONT.FT font file does not exist, only 24 display rows are possible

Reflection cannot find DECFONT.FT and can therefore only show the default number of display rows (24). Get this file from your Reflection product disks. (Type `SETUP /D <drive:>DECFONT.*` at the DOS prompt to decompress just this file.)

Detach from Comm Exec server failed

Connection Manager error. Your attempt to disconnect from a Communications Executive server using NetWare for LAT failed.

Device name not allowed. Choose another name.

The device you have specified on the Printer Setup dialog box does not follow DOS device naming conventions.

Devices may not share the same com port

You have set up your datacomm and printer to use the same port. Change the port designation for either one.

DIALHOST.RCL not found

The command file DIALHOST.RCL is invoked when you use Reflection's modem dialer. If you see this message, you need to change to your Reflection directory. If the file is not there, get it from your Reflection product disks. (Type `SETUP /D <drive:>DIALHOST.*` at the DOS prompt to decompress just this file.)

Disconnected

You have been disconnected from the network software. The LAN connection was either not established or lost.

Disk (DOS) error

DOS error message. A DOS error was detected. Check to make sure that you provided the correct DOS path and filename.

Disk read failed

Reflection attempted to read from the disk and received an error. Perform a CHKDSK operation at the DOS prompt.

Disk space exhausted—file closed

This message appears when a floppy disk is filled during a file transfer from the host. The function key labels are changed, giving you the option of continuing the file on a new disk or canceling the file transfer.

DOS is busy

This error may occur if memory handling software such as the DOS 5.0 Task Swapper is being used. If this message is displayed repeatedly, you may have to exit one of your other applications.

Drive not ready

Insert a floppy disk and close the door of the requested disk drive. If Reflection or another program is running from a floppy disk drive, you must have a disk in the drive in order to use the hot-key.

Duplicate filename or file not found

You have referenced an existing DOS file where a new filename is required, or the file cannot be found.

Encryption version mismatch

The command file you are trying to run was encrypted with a version of the CRYPT utility that is now obsolete. Get a copy of your original command file and encrypt it with the CRYPT utility distributed on your current Reflection disks.

Enter filename:

This message appears when you save a configuration file or open a disk file for output. If a default filename is displayed, you can use that name by pressing **[Enter ↵]**. If you want to clear the message without entering a filename, press the function key labeled CANCEL. Otherwise, enter a file specification and press **[Enter ↵]**.

ERROR: Continuation not found

KEYCOMP error message. An ampersand (&) was found in the keyboard mapping file, but the expected continuation line did not follow it.

ERROR: Continuation not last token of line

KEYCOMP error message. An ampersand (&) is a reserved character that allows you to concatenate a long string in your keyboard mapping file. It must be the last character of a line.

ERROR: Equals sign (=) expected

KEYCOMP error message. Each keyboard mapping statement requires an equals sign.

ERROR: Invalid combination of shift keys

KEYCOMP error message. Shift keys (**[Shift]**, **[Ctrl]**, and **[Alt]**) cannot be used twice, and must be combined with another key or keys.

ERROR: Invalid control code

KEYCOMP error message. ASCII control codes in the range 0–31 can be specified. The first character of an ASCII control code is a caret (ASCII code 94).

ERROR: Invalid keyboard ID

KEYCOMP error message. The keyboard ID you specified in the keyboard statement of your keyboard mapping file (for example, TEST.KBM) cannot be used with this Reflection product. This message also occurs if `keyboard-id =` has no keyboard ID assigned.

ERROR: NULL must be only outspec

KEYCOMP error message. The NULL keystroke must be the only specification for a key: it cannot be combined with another specification.

Error opening log file

(Plus option only) Reflection can be set up to create log files for backups and restores (BACKUP.LOG and RESTORE.LOG). If you receive this error message perform a CHKDSK on the log file in question.

ERROR: Open string

KEYCOMP error message. An opening quote is included in a keystroke definition, but there is no closing quote.

ERROR: Outspec may not exceed 127 characters/functions

KEYCOMP error message. Up to 127 characters or functions can be assigned to a single keystroke in a keyboard mapping file. Your specification has exceeded this limit.

ERROR: Reset function must be only outspec

KEYCOMP error message. Reset functions (hard-reset, soft-reset, communications-reset, or exit-to-dos) cannot be combined with other functions: they must be the only output specification for a particular keystroke.

ERROR: Syntax error

KEYCOMP error message. Type `KEYCOMP /?` to see the correct syntax.

ERROR: Table overflow—too many remapped keystrokes

KEYCOMP error message. Depending on the size of the strings in a keystroke definition, up to 512 keystrokes can be mapped.

ERROR: Too many continuations

KEYCOMP error message. A maximum of 3 continuations, represented by an ampersand (&) at the end of a line, can be used to concatenate a long string assigned to to one keystroke.

Error uploading VAXLINK2 to host

This message further advises you to retry the upload using the “mini-Kermit” method, which is described on page 487.

ERROR: Value is out of range

KEYCOMP error message. You can use a decimal representation for a character; the value must be in the range 0-255. Also see the description of “ERROR: Invalid control code.”

Expected “TERM” constant

KEYCOMP error message. No terminal specification statement was included in the keyboard mapping file. If you are using Reflection’s ANSI emulation, this file must include `term = ansi`. A terminal type of VT is otherwise assumed.

Extra text at end of command, <x>

Reflection Network Series message. You have added a string <x> at the end of the command that is not a recognized keyword.

Fatal error attempting to load overlay

This message appears if Reflection is unable to access the R?.EXE file for loading overlays. Press **[Enter]** to clear the message; Reflection then exits immediately to DOS. You will see this message, for example, if you download a new copy of Reflection, overwriting the one you are using. DOS 4.0 users with SHARE installed may also see this message; see page 484.

Feature not included in this version

The feature that you have selected is not part of the software you are using. Call Walker Richer & Quinn about an upgrade.

File corrupted but backed up

During the backup process a discrepancy was found between a file’s actual size and the size as indicated in the directory entry. In the rare case that file corruption is detected after the file has begun to be backed up, the exact number of bytes as indicated in the file’s directory entry are always sent. This may mean padding with binary zeros or truncating the file. Use the DOS CHKDSK command to check for corruption on your disk.

File corrupted, NOT backed up

Before a file is backed up, it is checked to ensure that its actual size matches the file's directory entry. This error message indicates that there is a discrepancy. Use the DOS CHKDSK command to check for corruption on your disk.

File exists

The specified file already exists. Either delete the file or use another name.

File not found

The requested file was not found. If this is a Reflection support file and you installed only a minimum of Reflection files, the requested file may be on your product disks. See page 15 for instructions on using the Setup program to retrieve individual files.

Format: KEYCOMP <source file> <config file>

KEYCOMP error message. You must specify a source file (such as TEST.KBM) and a configuration file (such as R4.CFG) in order to compile mapping statements into a configuration file.

Host is busy

You have entered a valid LAT service name or IP address, but the ports on the host or terminal server to which you connect are all in use.

Host network is unreachable

Reflection Network Series message. The host you specified is a legal format (for example, an IP address), but no route to that host exists.

Host software requires OLD-WRQ transfer protocol

This message is accompanied by error code 26. You have a host startup sequence that specifies PCLINK, VAXLINK, or UNIXLINK, but you have WRQ set as your protocol. If you want to use one of these startup sequences, change the File Transfer Protocol list box in the File Transfer Setup dialog box to OLD-WRQ.

Incompatible configuration file version—using default values

Reflection stores a version number as part of its configuration files. If the version number of the configuration file does not match the expected version number, this message is displayed. If the default values are not satisfactory, you must create a new default configuration file.

Incompatible host software—you must do an upload

The current release of Reflection is distributed with host file transfer programs that require the WRQ protocol. To use the WRQ protocol, you must upload the current version of VAXLINK2.EXE and UNXLINK2.C from the support files diskettes (see page 381). Previous Reflection file transfer programs can still be used by choosing the OLD-WRQ protocol. The host startup sequence varies based on the protocol selected. See page 474.

Incorrect password

You can add a password when connecting to a password-protected LAT service. This message is returned when the password is not recognized.

Insufficient free memory for Requested Display Memory, only ##k allocated

The amount of display memory you requested in the Advanced Display Setup dialog box is more than is available on your PC. Only ##k of memory were allocated.

Insufficient memory

Your PC has insufficient free memory for the SHELL command. Try reducing the setup value for Requested Display Memory in the Advanced Display Setup dialog box, and for Buffer Size in the Printer Setup dialog box. If other memory-resident programs are installed, exit Reflection, uninstall the memory-resident programs, and try again.

Insufficient memory for print buffer; only xxK allocated

The print buffer and display memory share PC memory the first time the print buffer is configured; there may be very little room left for the print buffer if display memory is full or nearly full. To empty display memory, bring up the command line (**Alt-F10**), and type **MCLEAR**. The next time Reflection is loaded, these buffers do not overlap.

Integrity test failed—start over

When Reflection uploads the host software, it sends the file to the host twice, then compares the two files. If they are not identical, this message is displayed. Perform the upload again.

In use

Reflection Network Series and CTERM command interpreter session status response. Indicates that a session is the current session of another "user" (another copy of Reflection).

Invalid command

Reflection did not recognize the command you entered on the command line.

Invalid command verb

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Invalid directory

Reflection could not find the directory you specified.

Invalid keyword

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Invalid or old DECFONT.FT font file, only 24 display rows are possible

The DECFONT.FT font file you are using is damaged or belongs to an earlier version of Reflection. You can therefore only show the default number of display rows (24). Get this file from your Reflection product disks. (Type `SETUP /D` <drive:>DECFONT.* at the DOS prompt to decompress just this file.)

Invalid parameter

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Invalid Set statement

KEYCOMP error message. Set statements define the initial state of NumLock and CapsLock and must precede keyboard mapping statements for keystroke definitions.

Invalid syntax

Reflection recognized the command you entered, but the parameters you used are incorrect.

Invalid syntax in filename

Reflection recognized the command you entered, but the filename has an invalid character. The following characters are not allowed in a PC filename:

(space)	,	;	?
"	/	<	[
*	\	=	]
+	:	>	

Invalid term—must be “VT” or “ANSI”

KEYCOMP error message. If a keyboard mapping file (such as TEST.KBM) does not indicate a term type, then VT is assumed.

Keyboard ID not specified

KEYCOMP error message. A keyboard mapping file (such as TEST.KBM) must include a statement that specifies the keyboard-ID, for example: `keyboard-id = enhanced`.

KEYCOMP: Config file version not compatible with keyboard mapping

KEYCOMP error message. A configuration file created with a version of Reflection 2.2 or earlier cannot be updated with this version of the keyboard mapping program.

KEYCOMP: Error opening config file

KEYCOMP error message. The configuration file (such as R4.CFG) could not be found in the directory specified, or you do not have access to this file.

KEYCOMP: Error opening source file

KEYCOMP error message. The source file (such as TEST.KBM) could not be found in the directory specified.

KEYCOMP: Error reading source file

KEYCOMP error message. The source file (such as TEST.KBM) was found, but the format is incorrect or there is some other problem reading the file.

KEYCOMP: Error writing to config file

KEYCOMP error message. This message typically appears if the disk space available is not sufficient for storing the configuration file.

KEYCOMP: Output file is not a compatible Reflection configuration file

KEYCOMP error message. The configuration file you specified (such as R2.CFG) is not in the correct format.

Limit reached, cannot start more sessions to this server

NetWare for LAT message. Each Communications Executive server connection you make can provide up to four LAT sessions. To start an additional LAT session using this server, you must first log off one of your established LAT sessions.

Local file does not exist

During a file transfer to the host, you specified a local filename that Reflection could not find in the specified drive.

Local file exists

This message is displayed when you are transferring a file from the host to the PC, and the file already exists on the PC. If you want to append to an existing file or overwrite it, change the value of If File Exists in the File Transfer dialog box. See page 187.

Missing Comm Exec server name or username

Connection Manager error. You must provide both a server name and a username when connecting to a Communications Executive server using NetWare for LAT.

Missing host name

Connection Manager error. You have issued the CONNECT command without specifying a host or a service.

Missing keyword

Connection Manager error. You have not completed the command; for example, typing SHOW without specifying sessions, services, or protocols returns this message.

Missing prompt string

To change the Connection Manager prompt, type PROMPT and add the string you want to use for the Connection Manager prompt.

Network error

An unexpected network error occurred. For some reason, the network cannot supply the connection that Reflection has requested. Check your network software.

Network software missing

With OfficeShare, this message appears if USRLOAD has not been executed prior to starting Reflection.

No available sessions

Connection Manager message. CONMGR does not have enough sessions configured to support the requested connection. Disconnect a session, or exit Reflection and increase the number of sessions for CONMGR using the /S switch.

No CTERM sessions available

You have reached the CTERM session quota established when the CTERM command interpreter was installed.

No current session

You are attempting to resume a Connection Manager session. Specify the session number explicitly.

No host response

This message is displayed at the start of a file transfer if Reflection does not receive the expected start-of-text character from the host system. This can happen if the host program was not uploaded, if the Host Startup Sequence parameter is incorrect, or if you are currently running a program on the host.

No Novell Comm Exec server found

Connection Manager error. NetWare for LAT message. You may have attempted to connect to a Novell Communications Executive server using a server name that is not valid or not available. You may have asked for a listing of the servers to which you are connected when you have no current connections.

No protocol modules have been loaded: you will not be able to connect to any host

You have selected CON-MGR as your Connection Type, but the appropriate network software was not loaded before you started Reflection. Exit Reflection, load the network software, and start Reflection again.

No target label

The label specified in a GOTO command does not exist.

Not a SCB or incorrect state

This is a memory corruption error. Exit Reflection and unload your Reflection Network Series software, then run STARTNET again.

Not a valid state file

Your Reflection serial number does not match the one in the state file you are trying to load. Reflection will come up with a blank screen and whatever settings are contained in the configuration file (if there is no configuration file, it will use its defaults). The invalid state file (R<n>STATE.STA) is automatically deleted (unless the /SK startup switch was used) and you should not see this error message again.

Not enough display memory for current session—some characters not displayed

You must increase the size of Requested Display Memory in the Display Setup dialog box. Save the change, exit Reflection, and then start Reflection again.

**Not enough display memory to save all of selected text to clipboard—
You must increase the size of display memory on Advanced Display Setup**

You must increase the size of Requested Display Memory in the Display Setup dialog box. Save the change, exit Reflection, and then start Reflection again.

NOT restored, cannot open file

You are attempting to restore a file to a device (such as PRN), or restore a file that has the same name as an installed device.

NOT restored, file changed since backup

This file was not restored because the file has been modified since it was backed up. This message occurs only if the /K parameter is used with the RESTORE command.

NOT restored, not enough disk space

There was not enough room on the disk to restore this file. This message is stored in the RESTORE.LOG file next to any file not restored. The restore operation continues so that smaller files may be restored.

NOT restored, system, hidden or read-only file

This file exists on the PC as a system, hidden, or read-only file. Use the /H parameter with the RESTORE command if you want to restore this file.

No workstation session resources

The workstation cannot support any more virtual circuits.

Num Lock state previously defined

KEYCOMP error message. The initial state of Num Lock can only be defined once in a keyboard mapping file.

Out of paper

DOS error—check your printer.

Parameter too long

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Password required

You are trying to connect to a password-protected service. If you do not specify a password as part of the CONNECT command at the Connection Manager prompt, you can type in a password when the service prompts you for it.

Path not found

The path indicated does not exist on the current drive.

When you are printing to disk (Printer Interface is set to *FILE*), this error message indicates that the path in the File Name list box is invalid. Check the Printer Setup dialog box, or display the command line and type `VERIFY PRINTER-FILE`.

Printer fault

Check your printer. It may be generating unnecessary printer error messages; if it is, type `SET IGNORE-PRINTER-ERRORS YES` on the command line.

Printer timeout

If you direct output to the printer when the printer is offline, out of paper, or otherwise inoperable, this message is displayed after several minutes have elapsed.

Protocol is out of resources

Connection Manager message. LATMGR (or, in the case of the Reflection Network Series, some other protocol module) does not have enough sessions configured to support the new connection request.

Read fault

An error was encountered when trying to read from the disk.

Received bad data

During file transfer, Reflection received consecutive strings of unsolicited or indecipherable data. The Error Retry Limit text box in the File Transfer Setup dialog box specifies the number of consecutive occurrences of this condition before the message is displayed and the transfer is terminated (see page 191).

Received unexpected packet type

The PC has received an unexpected packet type. The file transfer was not completed; try the transfer again.

Record size must be positive numeric

The record size given for a file transfer to the host has been entered incorrectly. Make sure the size indicated is a positive number.

Reflection configuration file was not created/updated

KEYCOMP error message. This typically appears with another KEYCOMP error message indicating the specific problem encountered when you ran KEYCOMP.

/S1 Disk error: invalid drive

The hot-key was pressed, but Reflection could not save the screen image to disk because the designated drive for the resulting file is not valid. To find out where your temporary screen image file (R<n>SCREEN.STA) is being sent, type `DISPLAY $TEMPDIR` on the Reflection command line. If you are using Reflection on a server, use this command to verify that your temporary files are not being stored on the server and shared by other users.

/S1 Disk error: screen image not saved

Reflection could not save the screen image to disk when the hot-key was pressed. To find out where the temporary screen image (R<n>SCREEN.STA) is being saved, type `DISPLAY $TEMPDIR` on the command line. You may see this error message if:

- ▲ The hard disk or RAM disk area to which the RTMP environment variable points is full.
- ▲ You have a read-only file that has the same name as the screen state file.

See “Setting the Directory for Temporary Files” on page 41 for more information.

Sector not found

DOS error message. The directory on your disk is probably damaged. Consult your DOS manual and try using the CHKDSK function.

Server error, protocol is not bound on server

NetWare for LAT message. Your Communications Executive server is not correctly configured to provide LAT services. The LAT protocol on the server has not been bound to the LAT card. Contact your Novell system administrator.

Service name table is full

Connection Manager message. When available LAT services are displayed, this message indicates that subsequent service broadcasts for new services cannot be added to the queue. You can increase the size of your service table using `/DIR` with `RLAT.EXE` if you are using the Reflection Network Series, or the equivalent `LATCP` parameter if you are using `PATHWORKS`.

Session is in use

Connection Manager error. You are attempting to resume a session that is already attached to a different copy of Reflection.

Stopped

CTERM command interpreter session status response. It indicates that the connection to the host has been terminated. Resuming a stopped session displays the reason the session stopped.

Terminated by user

The file transfer was ended by the user (for example, **[Esc]** was pressed while transfer was in progress).

The disk is full—change disks and try again

Insert another formatted floppy disk to continue the operation you were attempting.

The print buffer is not empty—is it OK to erase it?

Whenever you change the size of the printer buffer in the Printer Setup dialog box, the buffer is completely rebuilt, which requires deleting the old buffer. When this message is displayed, press **YES** or **NO**. If you press **NO**, the buffer is not changed (see page 285).

There is no configured printer

You attempted to direct output to a printer, but Printer Interface in the Printer Setup dialog box has a value of **NONE** (see page 276).

There is no open printer file

Your printer interface is set to **FILE**, but the file specified in File Name in the Printer Setup dialog box is not open. Type **OPEN PRINTER** on the command line, or go to the Printer Setup dialog box and re-activate its settings.

There is not enough available memory to run Reflection

Either your computer does not have enough memory, or DOS has allocated some memory to another program.

Too many open files

The DOS limit for the number of opened files has been exceeded. The limit can be adjusted in the DOS configuration file (**CONFIG.SYS**). Consult your DOS manual.

This message will also appear if you have invoked too many command file levels. (A Reflection command file can invoke other Reflection command files, to a depth of 10 levels.)

Too many parameters

CTERM command interpreter syntax error. The CTERMCI commands are described on page 114.

Transfer aborted—record longer than 32767 bytes

ASCII file transfer. If you see this message, change your transfer method to binary and try the transfer again. If you are confident that the method should be ASCII, disable fast file transfer with the command `SET FAST-FILE-XFER NO.` VAXLINK2 splits lines that are longer than 32767 bytes.

Transfer link failed

A number of situations can arise during a file transfer to cause this error message to appear:

- ▲ During a file transfer, each block of data is assigned a consecutive block number. The transfer process synchronizes on this number and can therefore tolerate delays and unsolicited retransmissions. However, if data blocks arrive greatly out of sequence, the transfer is terminated and the above message is displayed.
- ▲ Reflection received consecutive strings of unsolicited or indecipherable data. The Error Retry Limit text box in the File Transfer Setup dialog box allows you to specify the number of times this can happen before the message is displayed and the transfer is terminated (see page 191).
- ▲ The PC has received an error during file transfer from which it could not recover. If the Transfer Link list box in the File Transfer Setup dialog box is set to 8-BIT, change the value to 7-BIT and try again.
- ▲ During a file transfer, Reflection experienced the configured number of consecutive timeouts without receiving any data response from the host.
- ▲ More than 20 consecutive Naks were received; that is, the host program was unable to read 20 consecutive packets. Ensure that Reflection's parity setting on the Datacomm Setup dialog box matches the host parity.

Transfer method must be A or B or I

File transfer method can only be A (ASCII) or B (binary), or I (image).

Transmit error

During file transfer, Reflection expected to find a signal on the CTS or DSR pins, but did not. A poor phone connection may have caused your modem to disconnect and drop carrier. If this is not the case, go to the Advanced Datacomm Setup dialog box and set clear the CTS Required check box. After doing this, try the transfer again.

Unable to access help file

You do not have an online help file (.HLP) in your Reflection directory. You can copy English, French, and German help files to your Reflection directory using the Setup program.

Unable to load text font, only 24 display rows are possible on text screen

Reflection cannot load the font information in DECFONT.FT and can therefore only show the default number of display rows (24).

Unexpected disk (DOS) error detected

Check the disk.

Unexpected error

An unrecoverable error occurred during a file transfer. Try again.

Unknown keyword <x>

The command <n> you entered at the Connection Manager prompt is not a Connection Manager command. Type `HELP` for a command summary.

Unknown node

The ISN name did not respond to the connection request.

Unrecoverable error loading state file

Reflection attempted to read the state file and received an error. The file may have been corrupted in some way or a disk error has occurred. Reflection will not run. Rename or delete the state file (probably R2STATE.STA or R4STATE.STA) and try running Reflection again.

Use NEXT or PREVIOUS key

Use the NEXT or PREVIOUS key to select your setup choices.

Value out of range

You entered an incorrect value in a list box within a Reflection dialog box.

Valid host filename required

The Host File Name in the File Transfer dialog box must be completed.

Valid local filename required

The Local File Name in the File Transfer dialog box must be completed.

VTCOM internal error

There is a problem with the network software. See your system manager.

Waiting for response from host

When you start a file transfer, Reflection sends out a startup sequence to begin running the host program and displays the above message while waiting for the host to respond. If you are currently running another program on the host or do not have an active session at all, the host cannot respond to the startup sequence. The New Line check box in the General Setup dialog box should be cleared.

Workstation name not found

The workstation node name has not been configured or installed.

Write fault

DOS error message. Your floppy disk is probably damaged.

Write-protected disk

DOS error message. Your floppy disk is write-protected.

You cannot run Reflection:**The current number of users is already at the maximum of <n>**

If you exceed the allowed number of users (<n>) for a server version of Reflection, the program does not run and this message is displayed at the DOS prompt.

You can increase the number of users by purchasing an "Add-on Pack" from Walker Richer & Quinn.

You must leave at least xxK of free memory to use the hot-key

When you use the hot-key there has to be enough free memory for COMMAND.COM and for storing the video image for your DOS application.

Control Functions

Control functions cause Reflection to perform certain actions, such as move the text cursor, insert a line, assign character attributes, and change character sets. Typically, the host sends control functions to Reflection to perform the desired actions. Some control functions have equivalent check boxes, list boxes, or option buttons in Reflection's Setup dialog boxes.

There are three symbols used in this section that describe a control function:

- ▲ CS_I stands for the Control Sequence Introduction character; when Reflection receives this character, it recognizes the string that follows as a control sequence.
- ▲ ES_C stands for the Escape character, and begins an escape sequence.
- ▲ DC_S stands for the Device Control String character, and begins a device control sequence.

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Using Control Functions

If you want to enter control functions locally, there are two ways to do so:

- ▲ Use the DISPLAY command.

For example, to move the cursor up four lines in the display, type the following on the command line:

```
DISPLAY "^[[4A"
```

The first two characters `^[]` represent the *escape* character. When followed by an additional `[]`, the three characters `^[[` represent a *control sequence introducer*. Control sequences are explained on page 535.

- ▲ Put Reflection in local mode by clearing the Online check box in the General Setup dialog box. Then type the control function from the keyboard. Using the same example as above, you would type `[Esc]` followed by `[]4A`. Reflection recognizes this as a control sequence and acts on it—you do not see the characters on the screen.

This chapter explains C0 and C1 control characters and provides the format for using multiple-character sequences. As you use this information, refer to the character set charts on pages 636 and 637.

Descriptions for the control functions that Reflection supports begin on page 539.

Three summaries of control functions begin on page 689. They are sorted by:

- ▲ Functionality (a separate tear-out card in this manual also includes a summary of control functions arranged this way)
- ▲ Actual sequence (for example, `^SI?1J`)
- ▲ DEC mnemonic (for example, `DECSLPP`)

A Word about Notation

The following notation is used throughout this section:

- ▲ Most control functions have a mnemonic identifier. You don't enter the mnemonic; it's simply a convenient "word" to help you remember the name of the control function.
- ▲ Where appropriate, a slash is used through a zero ($\emptyset$) to distinguish it from an uppercase O.
- ▲ Note the difference between a lowercase L (l) and the number 1 (1).
- ▲ References are occasionally given to a character's decimal value in the character set charts. For example, the space character is ASCII decimal 32.
- ▲ Parameters you may supply for a sequence are enclosed in angle brackets. For example, when using the control function $^{CS_I<N>A}$, replace $<n>$ with the number of lines you want the cursor to move. If $<n>$ is omitted, the default is used. For most sequences, the default is 1 (when there is not a corresponding $\emptyset$ sequence).
- ▲ Numeric parameters are represented by ASCII strings. For example, in the sequence $^{CS_I10;13H}$, the numbers are the strings 10 and 13, not the decimal values 10 (LF character) and 13 (CR character).

Numeric parameters are constrained to the range 0–9999, inclusive. Any numeric parameter with a value greater than 9999 is interpreted as 9999.

The minus and plus signs are not within the range of legal parameter characters, and signed numbers cause a control sequence (CS_I) or device control string (DCS) to be rejected.

Control Characters

A control character is used to perform an action, such as moving the cursor down one line. There are two sets of control characters available on the VT200 (and higher) series terminals that form single-character control functions:

- ▲ C0 control characters have decimal values 0 through 31 in the character charts. Each C0 character is encoded in 7 data-bits, with the high-order bit always 0. C0 codes, therefore, can be used in both 7-bit and 8-bit operating environments.
- ▲ C1 control characters have decimal values 128 through 159 in the character charts. Each C1 character is encoded in 8 data-bits, with the high-order bit always 1. They provide a few more functions than the C0 characters, but can be used directly only in 8-bit operating environments.

To send a C1 control character in a 7-bit operating environment, you can convert it to a two-character escape sequence; see page 533 for conversion information, and page 532 for 7-bit equivalents.

L_F and C_R , for example, are single-character control functions found in C0. The table below shows the single-character control functions that Reflection recognizes. The character charts on pages 636 and 637 also show the C0 and C1 controls.

C0 controls are recognized in both 7-bit and 8-bit environments as shown. Each character can be generated by the keystroke shown; for example, press **Ctrl-E** to generate the E_{NQ} character. Reflection uses only those codes denoted by an asterisk (*) in the following table.

C0 Controls (Decimal 0–31)

ASCII Decimal	Keystroke	VGA/EGA Display	CGA/Mono Display	Definition
0		NUL	N _U	Null (Ignored)
1		SOH		Start of header
2		STX		Start of text
3		ETX		End of text
4		EOT		End of transmission
5	*	ENQ		ENQuiry The answerback message is transmitted.
6		ACK		ACKnowledge
7	*	BE _L	•	Bell The bell is sounded if the Warning Bell check box is selected.
8	*	B _S		Backspace Moves cursor left one position on the current line.
9	*	H _T	○	Horizontal tab Moves cursor to the next tab stop. If there are no more tab stops, the cursor moves to the right margin.
10	*	L _F	◉	Linefeed Causes a linefeed or new line operation, depending on the setting of linefeed/new line (the LNM function).
11	*	V _T	♂	Vertical tab Same as linefeed.
12	*	F _F	♀	Form feed Same as linefeed.
13	*	C _R	♪	Carriage return Moves the cursor to the left margin of the current line.
14	*	S _O	♪	Shift out (locking shift 1) Maps the G1 character set into GL. You designate G1 by using a Select Character Set (SCS) sequence; see page 594.
15	*	S _I	☼	Shift in (locking shift 0) Maps the G0 character set into GL. You designate G0 by using a Select Character Set (SCS) sequence; see page 594.

ASCII Decimal	Keystroke	VGA/EGA Display	CGA/Mono Display	Definition
16		D _{LE}	►	Data link escape
17	*	D _{C1}	◄	Device control 1 (XON) When Transmit Pacing (Advanced Datacomm Setup) is set to XON/XOFF, a D _{C1} causes Reflection to continue sending characters.
18		D _{C2}	↕	Device control 2
19	*	D _{C3}	!!	Device control 3 (XOFF) When Transmit Pacing (Advanced Datacomm Setup) is set to XON/XOFF, a D _{C3} causes Reflection to stop sending characters. Reflection cannot resume sending characters until it receives a D _{C1} control character. Do a communications reset () to reset this condition.
20		D _{C4}	¶	Device control 4
21		N _{AK}	§	Negative ACKnowledge
22		S _{YN}	—	Synchronous idle
23		E _{TB}	↕	End of transmission block
24	*	C _{AN}	↑	Cancel When received during an escape or control sequence, cancels the sequence.
25		E _M	↓	End of medium
26		?	ı	Substitute Same as cancel, except that it displays a backwards question mark (an error mark).
27	*	E _C	←	Escape Introduces an escape sequence. Cancels any escape or control sequence in progress.
28		F _S	L	Field separator
29		R _S	▲	Record separator
31		U _S	▼	Unit separator
127		Δ	Δ	Ignored when received; delete should not be used as a fill character.

The C1 control characters below are recognized correctly in both 7-bit and 8-bit terminal modes. In 7-bit modes (such as the VT100), the C1 codes are, by default, automatically converted to their 7-bit equivalents. The following section explains how the 7-bit equivalents are calculated. See page 544 for a list of control functions ignored in VT100 mode (operating level 1).

C1 Controls (Decimal 128–159)

Decimal Value	Display Mnemonic	7-Bit Equivalent	Definition
128	B_0		Ignored
129	B_1		Ignored
130	B_2		Ignored
131	B_3		Ignored
132	* I_{ND}	E_{SCD}	Index Moves cursor down one line in same column and scrolls at bottom margin.
133	* $\text{N}_{\text{E}_\text{L}}$	E_{SCE}	Next line Moves cursor to first position of next line and scrolls at bottom margin.
134	S_{SA}		Start selected area
135	E_{SA}		End selected area
136	* H_{TS}	E_{SCH}	Horizontal tab set Sets a tab stop at the cursor position.
137	H_{TJ}		Horizontal tab with justification
138	V_{TS}		Vertical tab set
139	P_{LD}		Partial line down
140	P_{LU}		Partial line up
141	* R_{I}	E_{SCM}	Reverse index Moves cursor up one line in the same column, scrolling at the top margin.
142	* S_{S_2}	E_{SCN}	Single shift 2 Maps G2 into GL for the next character only.
143	* S_{S_3}	E_{SCO}	Single shift 3 Maps G3 into GL for the next character only.
144	* D_{CS}	E_{SCP}	Device control string introducer
145	P_{U_1}		Private use 1
146	P_{U_2}		Private use 2
147	S_{TS}		Set transmit state

Decimal Value	Display Mnemonic	7-Bit Equivalent	Definition
148	C _H		Cancel character
149	M _N		Message waiting
150	S _{P_A}		Start protected area
151	E _{P_A}		End protected area
152	9 _B		Ignored
153	9 _G		Ignored
154	9 _A		Ignored
155	* C _{S_I}	ESC [	Control sequence introducer
156	* S _T	ESC \	String terminator
157	O _{S_C}		Operating system command
158	P _M		Privacy message
159	A _{P_C}		Application program command

Converting 8-Bit Controls to 7-Bit Equivalents

In a 7-bit environment (such as in VT100 mode), you can send an 8-bit C1 control character by converting it to an equivalent 7-bit escape sequence. The 8-bit controls are single character codes, whereas the 7-bit equivalents are two-character escape sequences (as shown in the table above).

To form an equivalent 7-bit escape sequence from an 8-bit control character:

1. Subtract the hexadecimal value 40 (decimal 64) from the C1 control code's value.
2. Precede the result with the ESC character.

For example, the I_{N_D} character (decimal 132) has a hexadecimal value of 84. To convert it to a 7-bit equivalent, first subtract hexadecimal 40:

$$84 \text{ hex} - 40 \text{ hex} = 44 \text{ hex}$$

Hexadecimal 44 is the letter *D*. Therefore, to represent the I_{N_D} character in a 7-bit environment, use ESC*D*.

Note: This manual usually shows control functions in their 8-bit format. You can always use an equivalent 7-bit escape sequence to represent the 8-bit control. ▲

Sending C1 Control Characters to the Host

Reflection can send C0 control characters to the host directly in both 7-bit and 8-bit environments. C1 characters, however, can be sent directly only in 8-bit environments. In 7-bit environments, a C1 character must be converted to its two-character escape sequence equivalent (as explained above).

Whether Reflection sends 8-bit C1 characters directly, or as their 7-bit equivalents, depends on the type of data path and the operating level of Reflection. To configure Reflection to send 8-bit C1 control characters in an 8-bit environment, do the following:

1. In the General Setup dialog box, select a value from the Mode list box with 8-bit controls: VT400-8.

You cannot use 8-bit controls if Reflection is configured as a VT52 or VT100 terminal; you are limited to a 7-bit environment.

2. Select an 8-bit data path for Parity in the Datacomm Setup dialog box, such as 8/EVEN.

By default, Reflection uses 7-bit controls, automatically converting 8-bit C1 characters to their 7-bit equivalents. You can force Reflection to convert control characters with the following sequences:

`ESC<SP>F` Switches Reflection from an 8-bit mode to a 7-bit mode. The mnemonic for this sequence is S7C1T.

`ESC<SP>G` Switches Reflection from a 7-bit mode to an 8-bit mode. The mnemonic for this sequence is S8C1T.

The <SP> indicates the space character (ASCII decimal 32).

These sequences have the same effect as selecting a value from the Mode list box in the General Setup dialog box. The operating level does not change; only the control mode changes. For example, if the mode is VT400-7, the S8C1T sequence switches Reflection to VT400-8. The operating level—VT400—does not change.

Note: The control mode used for sending C1 controls has no effect on Reflection's ability to receive and interpret C1 controls. As long as the data path allows 8 data-bits, 8-bit controls are correctly interpreted (regardless of the control mode). ▲

Multiple-Character Control Functions

The C0 and C1 codes listed in the tables above (and in the charts on pages 636 and 637) are single-character control functions, performing simple functions.

Multiple-character control functions, in contrast, can perform many more functions than the C0 and C1 controls, and are formed by a sequence of characters.

There are three types of multiple-character functions, introduced by C0 and C1 control characters:

- ▲ Escape sequences, introduced by the ESC character (decimal 27).
- ▲ Control sequences, introduced by the CSI character (decimal 155).
- ▲ Device control strings, introduced by the DCS character (decimal 144).

Multiple-character control functions can include both control characters and normal ASCII text, such as letters, numbers, and punctuation.

For example, the multiple-character control sequence $^{DCS}0!u\%5^ST$ assigns a user-preferred supplemental character set.

The three types of multiple-character control functions are discussed here.

Escape Sequences

An escape sequence is a character string beginning with the C0 escape character ESC (decimal 27). You can enter the ESC character by pressing **[Esc]** or **[Ctrl]-[I]**. After receiving the ESC character, Reflection interprets the next characters as part of the sequence. Escape sequences are usually sent to Reflection from the host, but you can also enter them from the keyboard in local mode or by using the DISPLAY command on the command line.

Control Sequences

A control sequence is a character string beginning with the C1 control sequence introduction character CSI (decimal 155). You can also use the 7-bit equivalent $^{ESC}[$ as the control sequence introducer. Enter the 7-bit equivalent by pressing **[Esc]** then **[I]**, or **[Ctrl]-[I]** then **[I]**. Control sequences usually include variable parameters.

The format is:

$C_{SI} P \dots P I \dots I F$

$P \dots P$ are zero or more *parameters*. You can have up to 16 parameters per control sequence, using a semicolon (;) to separate each one.

$I \dots I$ are zero or more *intermediate* characters.

F is a *final* single character indicating the end of the control sequence.

For example, the following control sequence sets the scrolling region, where the top margin is at line 7 and the bottom margin is at line 18:

$C_{SI} 7;18r$

Device Control Strings

A device control string begins with the C1 device control string introduction character DCS . You can also use the 7-bit equivalent ^{ESC}P as the device control string introducer. You can enter the 7-bit equivalent by pressing $\boxed{\text{Esc}}$ then $\boxed{P}$, or $\boxed{\text{Ctrl}}\text{-}\boxed{[}$ and then $\boxed{P}$ (the letter P is case sensitive). A device control string always includes a data string.

The format is:

$^{DCS} P \dots P I \dots I F <\text{data string}> S_T$

$P \dots P$ are zero or more *parameters*. You can have up to 16 parameters per sequence, using the semicolon (;) to separate each one.

$I \dots I$ are zero or more *intermediate* characters.

F is a *final* single character indicating the end of the string.

$<\text{data string}>$ is a string of zero or more characters. The semicolon (;) delimiter separates individual strings. The particular range of characters included in a data string is determined by the individual control function. Any character except S_T (decimal 156) can be included in a data string.

S_T is the *string terminator*. The 7-bit equivalent is $^{ESC}\backslash$. You can enter the 7-bit equivalent by pressing $\boxed{\text{Esc}}$ then $\boxed{\backslash}$, or $\boxed{\text{Ctrl}}\text{-}\boxed{[}$ then $\boxed{\backslash}$.

Interrupting Control Sequences

You can use the following C0 control characters to interrupt escape and control sequences, and to recover from errors.

- | | |
|-----------------------|---|
| C_{AN} (decimal 24) | Indicates that the present data is bad or cancels a sequence in progress. Reflection interprets the characters that follow the C_{AN} character as usual. |
| S_{UB} (decimal 26) | Cancels a sequence in progress. Reflection interprets the characters following S_{UB} as usual. |
| E_{SC} (decimal 27) | Cancels a sequence in progress and begins a new sequence. |

Control Function Descriptions

This chapter describes all of the VT terminal control functions that Reflection supports. Control functions are grouped by function, and include their mnemonic identifier. If a function is linked to a setup field in a dialog box, a page reference for the field is also given.

Reflection Control Functions

When you use Reflection and a PC instead of a terminal, there are a few control functions unique to Reflection that aren't available on the terminal. For example, because Reflection has a product serial number, there's a control function to request the serial number; a host application might use this information to determine which Reflection product is in use.

Invoke Reflection Commands (WRQCMD)

`Dcs1234;Ps{<command>ST`

Invoke Reflection *<command>*, and control the completion code returned to the host. The command should not be terminated by a carriage return. The *Ps* parameter specifies the completion code to return, as shown in the following table. A VT terminal ignores this sequence.

<i><Ps></i>	Completion Code
0 (default)	Execute Reflection command and return a completion code if SET DISABLE-COMP-CODES is set to NO. A completion code of S (success) or F (failure) is returned, followed by a carriage return.
1	Execute Reflection command and always return a completion code, regardless of the SET DISABLE-COMP-CODES command.
2	Execute Reflection command and never return a completion code, regardless of the SET DISABLE-COMP-CODES command.

For more information about executing Reflection commands from the host using this sequence, see the SET HOST-INITIATED-COMMANDS command in the *Reflection Command Language* manual.

Request Reflection Serial Number (WRQRQSN)

`CSI0;1234c`

Request serial number of Reflection. Reflection responds with a 14-character serial number. The format of the serial number is described in the *Reflection Command Language* manual under \$SERIAL.

Using WRQINQ.IMG

`CSI0;1234c` should be used to test for Reflection in a situation where there may be VT terminals, or PC and Macintosh computers running other terminal emulators. The supplied support file, `WRQINQ.IMG`, is an executable program for the VAX that requests the Reflection serial number in a way that can easily be used in a DCL program.

To install `WRQINQ`, upload it to your VAX host using the `WRQ` file transfer protocol and the image transfer method. To upload the file, bring up the command line and type the following:

```
SEND WRQINQ.IMG TO WRQINQ.EXE IMAGE
```

On the VAX, the `WRQINQ.EXE` program queues an asynchronous read to the terminal, then locks the keyboard and sends the Reflection serial number request sequence, `CSI0;1234c`. The pending read is set to terminate on a `c` or `CR`, or to timeout after five seconds. The received string is assigned to the DCL symbol `REFLECTION_ID`. When the read terminates (it receives a terminator or it times out), the keyboard is unlocked.

When executing the file, three different values may be returned in the symbol `REFLECTION_ID`, depending on the emulator or terminal found:

- ▲ Reflection returns its serial number (for example, `I04+430I123456`)
- ▲ A VT200 or higher series terminal returns the primary device attribute response (explained on page 606)
- ▲ If neither is present, the string `NO RESPONSE` is returned

See `SET HOST-INITIATED-COMMANDS` and `$SERIAL` in the *Reflection Command Language* manual for more information.

Connection Reset

$E_{Sc\&bR}$

This sequence does one of the following, depending on the environment:

- ▲ Suspends a LAN session.
- ▲ Resets an internal Hayes Smartmodem 1200B modem card by setting the *out 1* bit of the modem control register to 1 for about 50 milliseconds.
- ▲ When CTERM CI is in use, this sequence returns you to the CTERM command interpreter.

Next Session

$E_{Sc\&bN}$

This sequence only has an effect if the Connection Manager or the CTERM command interpreter is in use. It switches you from one active session to another without returning to the CON-MGR> or CTERM> prompt.

Display Main Menu

$E_{Sc\&oS}$

Displays the main menu label set.

Display PF Key Labels

$E_{Sc\&OT}$

Displays the PF key label set.

Display Softkey Labels

$E_{Sc\&OR}$

Displays the softkey label set.

Display Status Line

$E_{Sc\&OU}$

Displays the VT320 status line and does not display any of Reflection's function key labels. The status line can be blank, host writable, or show your cursor position, depending on the most recent value for $C_{SI<n>\$}$ received (or the setting of Status Line in the Display Setup dialog box).

Screen Refresh

Esc&OD Reinitializes the video card and redisplay the screen. This sequence does not attempt to restore a ReGIS or Tektronix image, only text images. Equivalent to the keystroke **Alt-=[**.

Defining Softkeys

Esc&f<attr><key><label length><string length><label><string>

This escape sequence let you define a Reflection softkey. The parameters *<attr>*, *<key>*, *<label length>*, and *<string length>* may appear in any order. However, the letter that identifies the last parameter must be in uppercase, and all the preceding identifiers must be in lowercase.

Softkey Escape Sequence Parameters

Variable	Parameters
<i><attr></i>	0a NORMAL (default) 1a LOCAL 2a NORMAL; appends <i>c_R</i> to <i><string></i> 3a COMMAND
<i><key></i>	Key number, 1k–8k (Default is 1k)
<i><label length></i>	0d–8d (Default is 0d)
<i><string length></i>	0L–80L (Default is 1L); -1 erases the field definition
<i><label></i>	A string of exactly <i><label length></i> characters
<i><string></i>	A string of exactly <i><string length></i> characters

If a parameter is omitted, the default value is used. If a value of zero is used for the *<label length>* or *<string length>*, then the current contents of the label or string are left unchanged. The *<label>*, if its length is not zero, must precede *<string>*.

The following example shows an escape sequence that assigns the string EDIT/EDT MYFILE to **[F1]**. The attribute is NORMAL with a carriage return (*<attr>* is 2a). The *<label length>* is 6, and the text that appears in the label is Editor. (The *<label length>* and text must match, otherwise the definition may begin in the label.)

Esc&f2a1k6d15LEditorEDIT/EDT MYFILE

Operating Levels

You can set up Reflection to emulate terminals from the VT52, VT100, and VT400 series using the DECSCL control functions described here. You may need to change operating levels if the host application you use requires a terminal from a specific series. The DECSCL functions in this section are linked to the Mode list box in the General Setup dialog box; see page 230.

You can select from three levels of operation:

- ▲ VT52 mode (explained on page 544). In VT52 mode, no DECSCL sequences are recognized; see page 629 for a list of control functions specific to the VT52 terminal.
- ▲ Level 1 for VT100 operation
- ▲ Level 4 for VT400 operation (this includes levels 2 and 3; it is the default level)

When you change the operating level, Reflection performs a soft reset (DECSTR); see page 627 for more information.

Select an Operating Level (DECSCL)

$^{CS}I61$ "p	Select level 1 operating level. In level 1, certain functions and sequences are not available; these are listed on page 544.
$^{CS}I6<n>;1$ "p	Select operating level 4 with 7-bit controls (<n> can be 2, 3, or 4).
$^{CS}I6<n>$ "p	Select operating level 4 with 8-bit controls (<n> can be 2, 3, or 4).
$^{CS}I6<n>;\emptyset$ "p	
$^{CS}I6<n>;2$ "p	

Select 7-Bit C1 Control Characters (S7C1T)

$^{ES}C<SP>F$	Send all C1 control characters as two-character, 7-bit equivalents. <SP> is the space character (ASCII decimal 32). This sequence changes the type of controls sent for the current operating level to 7-bit controls; the operating level does not change.
---------------	---

Select 8-Bit C1 Control Characters (S8C1T)

$^{\text{ES}}\text{C}<\text{SP}>\text{G}$ Send all C1 control characters as single 8-bit characters. $<\text{SP}>$ is the space character (ASCII decimal 32). This sequence changes the type of controls sent for the current operating level to 8-bit controls; the operating level does not change.

Select VT52 Mode

$^{\text{CS}}\text{I?21}$ Select VT52 emulation mode. In this mode, only VT52 control functions are recognized (see page 629 for a list).

Exit VT52 Mode

$^{\text{ES}}\text{C}<$ Exit VT52 emulation and enter VT100 mode.

VT100 Mode—Ignored Escape Sequences

When you set up Reflection to emulate a VT100 series terminal, certain restrictions apply:

- ▲ Reflection sends only 7-bit characters. All C1 control characters are sent as 7-bit equivalents.
- ▲ The 8th bit of all received characters is set to $\emptyset$.
- ▲ Keystrokes that send characters from the DEC Supplemental Graphic or ISO Latin-1 supplemental character set result in errors.
- ▲ The user-defined keys, six editing keys (Find, Insert Here, etc.), and function keys do not operate, with the exception of the following three function keys:
 - VT $\boxed{\text{F11}}$ sends the $^{\text{ES}}\text{C}$ character
 - VT $\boxed{\text{F12}}$ sends the $^{\text{BS}}$ character
 - VT $\boxed{\text{F13}}$ sends the $^{\text{LF}}$ character

These function keys are specific to VT100 mode, and do not perform the same functions in higher operating levels.

- ▲ A limited number of character sets are available; see page 595. Soft character sets are not available.

In VT100 mode, the following control functions are ignored:

Mnemonic	Meaning
DECCIR	Cursor information report
DECDLD	Downloadable character set
DECRQM	Request mode
DECRPM	Report mode
DECRPSS	Report selection or setting
DECRQPSR	Request presentation state
DECRQTSR	Request terminal state
DECRQSS	Request selection or setting
DECRSPS	Restore presentation state
DECRSTS	Restore terminal state
DECSASD	Select active status display
DECSA	Select character protection attribute
DECSER	Selective erase in display
DECSEL	Selective erase in line
DECSST	Select status line type
DECSTR	Soft terminal reset
DECTABSR	Tabulation stop report
DECTSR	Terminal state report
DECUDK	User-defined keys
DSR	UDK and keyboard language
ECH	Erase character
ICH	Insert character
LS2	Locking shift 2
LS3	Locking shift 3
LS1R	Locking shift 1 right
LS2R	Locking shift 2 right
LS3R	Locking shift 3 right
S7C1T	Send 7-bit C1 controls
S8C1T	Send 8-bit C1 controls

Character and Line Attributes

You can use control functions to select visual attributes for characters and lines. Visual character attributes change the way characters appear on the screen without changing the actual characters.

Character attributes differ, depending on whether Reflection is running in VT or ANSI mode. VT mode attributes are discussed below; ANSI mode attributes are covered on page 549.

Character Attributes (VT Mode)

You can set the following character attributes:

- ▲ Bold
- ▲ Underline
- ▲ Blinking
- ▲ Inverse video

Select Graphic Rendition (SGR)

$c_{sI<n>}; \dots <n>m$ Lets you specify one or more character attributes at a time. The $<n>$ is a number representing a visual attribute listed in the following table. To select more than one attribute, separate each one with a semicolon. The default is $\emptyset$, which clears all attributes.

Attribute	On $<n>$	Off $<n>$
Clear all attributes	$\emptyset$	
Bold	1	22
Underline	4	24
Blinking	5	25
Inverse video	7	27
Invisible	8	28

Color	Foreground <n>	Background <n>	ReGIS plane #
Black	30	40	0
Red	31	41	10
Green	32	42	11
Yellow	33	43	14
Blue	34	44	9
Magenta	35	45	12
Cyan	36	46	13
White	37	47	7

You can use the SGR control function to set both color and character attributes (such as blinking and bold):

- Bold** Sets the foreground color bold (intense). This only works in text mode if the EGA Character Sets list box in the Video Options Setup dialog box is not set to *ALL*.
- Underline** Underlines the character in graphics mode (Reflection 2 bit-mapped— R2 /B132—and Reflection 4). Appears as inverse in text mode (Reflection 2).
- Blink** Makes the character blink or sets the background color bold, depending on the setting of the Enable Text Blink check box in the Color Setup dialog box.
- Inverse** Swaps the foreground and background colors.

For example:

- `CSI46;35m` Sets the background color to cyan and the foreground color to magenta.
- `CSI1;46;35m` Sets the background color to cyan and the foreground color to bold magenta.
- `CSI7;46;35m` Sets the background color to magenta and the foreground color to cyan.

After selecting an attribute, Reflection applies that attribute to all new characters received. If you move characters by scrolling, the attributes move with the characters.

Line Attributes (VT Mode)

Line attributes affect the way a line of characters appears on the screen.

Single-Width, Single-Height Line (DECSWL)

ESC#5 Select single-width, single-height line for the line containing the cursor. This line attribute is the default for all new lines on the screen.

Double-Width, Single-Height Line (DECDWL)

ESC#6 Select double-width, single-height line for the line containing the cursor. Any characters that extend beyond the right edge of the double-width, single-height line are lost, even if the line is returned to single width.

When the cursor is on a double-width line, it becomes twice as wide so that it can move one character at a time. Cursor positioning sequences (such as CUP on page 552) also use the enlarged character cells; therefore, on an 80-column display, a CUP sequence can address columns 1–40 on a double-width line.

Double-Width, Double-Height Line (DECDHL)

ESC#3 Select the top half of the line containing the cursor as double-width, double-height.

ESC#4 Select the bottom half of the line containing the cursor as double-width, double-height.

Only the top or bottom half of the characters appears on the line; for best results, make sure the characters used to generate the top half of the line match the characters used to generate the bottom half.

When the cursor is on a double-width line, it becomes twice as big, so that it can move one character at a time. Cursor positioning sequences (such as CUP on page 552) also use the enlarged characters; therefore, on an 80-column display, a CUP sequence can address columns 1–40 on a double-width line (a single-width line would address columns 1–80, as usual).

Character Attributes (ANSI Mode)

$^{\text{C}}\text{S}_{\text{I}<\text{n}>; \dots <\text{n}>\text{m}$

As in VT mode, this control sequence lets you specify one or more character attributes at a time. The $<\text{n}>$ is a number representing a visual attribute listed in the table below. To select more than one attribute, separate each one with a semicolon. The default is $\emptyset$, which clears all attributes.

Attribute	On $<\text{n}>$	Off $<\text{n}>$
Clear all attributes	$\emptyset$	
Bold	1	22
Underline	4	24
Blinking	5	25
Inverse video	7	

The effect of each attribute is:

Clear	Sets the foreground and background colors to their defaults. These defaults can be set with $^{\text{C}}\text{S}_{\text{I}2}; <\text{c}1>; <\text{c}2>\text{m}$, explained on page 550.
Bold	Sets the foreground color bold (intense) for the current color. If the foreground color changes, it will remain intense until $^{\text{C}}\text{S}_{\text{I}0\text{m}}$ or $^{\text{C}}\text{S}_{\text{I}22\text{m}}$ is received.
Underline	Underlines the character in graphics mode and has no effect in text mode. This sequence remains in effect until $^{\text{C}}\text{S}_{\text{I}0\text{m}}$ or $^{\text{C}}\text{S}_{\text{I}24\text{m}}$ is received.
Blink	Sets the background intensity/blink bit on for intense/blink colors. If the background changes, it will remain intense/blinking until $^{\text{C}}\text{S}_{\text{I}0\text{m}}$ or $^{\text{C}}\text{S}_{\text{I}25\text{m}}$ is received.
Inverse	Sets the foreground and background colors to defaults for reverse video. These defaults can be set with $^{\text{C}}\text{S}_{\text{I}7}; <\text{c}1>; <\text{c}2>\text{m}$, explained on page 550. The inverse attribute is affected by the state of foreground bold ($^{\text{C}}\text{S}_{\text{I}1\text{m}}$) and background intensity/blink ($^{\text{C}}\text{S}_{\text{I}5\text{m}}$). The VT sequence for turning inverse off ($^{\text{C}}\text{S}_{\text{I}27\text{m}}$) has no effect in ANSI mode.

Color (ANSI Mode)

Set Mode to SCO ANSI or BBS ANSI in the General Setup dialog box for the following sequences:

$C_{SI3}<n>m$ Set foreground color to $<n>$.

$C_{SI4}<n>m$ Set background color to $<n>$.

The $<n>$ can be one of the following:

$<n>$	Color	$<n>$	Color	$<n>$	Color	$<n>$	Color
0	Black	2	Green	4	Blue	6	Cyan
1	Red	3	Yellow	5	Magenta	7	White

The following sequences are valid only Mode in the General Setup dialog box is set to either SCO ANSI or BBS ANSI:

$C_{SI=<n>F}$ Sets the default normal foreground color to $<n>$; see the table below. This sequence also sets the current color to $<n>$.

$C_{SI=<n>H}$ Sets the reverse video foreground color to $<n>$; see the table below.

$C_{SI=<n>G}$ Sets the default normal background color to $<n>$; see the table below. This sequence also sets the current color to $<n>$.

$C_{SI=<n>I}$ Sets the reverse video background color to $<n>$; see the table below.

$C_{SI2;<c1>;<c2>m}$ Sets the default normal color for the foreground to $<c1>$ and for the background to $<c2>$; see the table below.

$C_{SI7;<c1>;<c2>m}$ Sets the default reverse video color for the foreground to $<c1>$ and for the background to $<c2>$; see the table below.

$C_{SI=1D}$ Turn on background blink/bold. This sequence is equivalent to C_{SI5m} .

$C_{SI=\emptyset D}$ Turn off background blink/bold. This sequence is equivalent to C_{SI25m} .

$C_{SI=\emptyset E}$ Turn off blink bit, allowing 16 colors to be displayed (the default). This sequence is equivalent to $C_{SI3;\emptyset m}$. It is equivalent to clearing the Enable Text Blink check box in the Color Setup dialog box.

$C_{SI3}; 0m$

Turn off blink bit, allowing 16 colors to be displayed (the default). This sequence is equivalent to $C_{SI}=0E$. It is equivalent to clearing the Enable Text Blink check box in the Color Setup dialog box.

 $C_{SI}=1E$

Turn on blink bit; 8 colors can be displayed. This sequence is equivalent to $C_{SI3}; 1m$. It is equivalent to selecting the Enable Text Blink check box in the Color Setup dialog box.

 $C_{SI3}; 1m$

Turn on blink bit; 8 colors can be displayed. This sequence is equivalent to $C_{SI}=1E$. It is equivalent to selecting the Enable Text Blink check box in the Color Setup dialog box.

The parameters $\langle n \rangle$, $\langle c1 \rangle$, and $\langle c2 \rangle$ can be one of the following:

$\langle n \rangle$	Color	$\langle n \rangle$	Color	$\langle n \rangle$	Color
0	Black	6	Brown	11	Light cyan
1	Blue	7	White	12	Light red
2	Green	8	Grey	13	Light magenta
3	Cyan	9	Light blue	14	Yellow
4	Red	10	Light green	15	Light white
5	Magenta				

Cursor Movement (VT Mode)

The cursor movement functions let you make the cursor visible or invisible and move it around on screen.

Text Cursor Enable Mode (DECTCEM)

$C_{SI} ? 25h$ Make the text cursor visible.

$C_{SI} ? 25l$ Make the text cursor invisible.

The Reflection setup equivalent for DECTCEM is the Cursor Visible check box in the Display Setup dialog box. See page 241.

Cursor Position (CUP)

$^cS_I<r>;<c>H$ Move the cursor to row $<r>$ and column $<c>$. Normally row 1, column 1 is the upper-left corner of the screen. However, if top and bottom margins have been defined (with DECSTBM on page 558) and origin mode is set (with DECOM on page 559), then the top row of the scrolling region is row 1. The cursor is never positioned beyond the bottom margin or right margin. If the screen width is greater than 80 columns, the display is scrolled horizontally, if necessary, to bring the cursor into view. The default is $^cS_I1;1H$.

Horizontal and Vertical Position (HVP)

$^cS_I<r>;<c>f$ Move the horizontal and vertical position of the cursor. This works the same as the CUP sequence above. This sequence is supported for compatibility with older programs: new applications should use CUP.

Cursor Forward (CUF)

$^cS_I<n>C$ Move the cursor forward (right) $<n>$ columns. If the screen width is greater than 80 columns, the display is scrolled, if necessary, to bring the cursor into view. If the cursor is at the right margin, it does not move.

Cursor Backward (CUB)

$^cS_I<n>D$ Move the cursor backward (left) $<n>$ columns. If the screen width is greater than 80 columns, the display is scrolled, if necessary, to bring the cursor into view. If the cursor is at the left margin, it does not move.

Cursor Up (CUU)

$^cS_I<n>A$ Move the cursor up $<n>$ lines in the same column. If the cursor is within the scrolling region, it stops at the top margin. If the cursor is above the top margin of the scrolling region, it stops at the top of the screen.

Cursor Down (CUD)

$CS_I < n > B$ Move the cursor down $<n>$ lines in the same column. If the cursor is within the scrolling region, it stops at the bottom margin. If the cursor is below the bottom margin of the scrolling region, it stops at the bottom of the screen.

Index (IND)

ES_{CD} or IN_D Move the cursor down one row. If the cursor is at the bottom margin, the display scrolls up one line.

Next Line (NEL)

ES_{CE} or NE_L Move the cursor to column 1 of the next line. If the cursor is at the bottom margin, the display scrolls up one line.

Reverse Index (RI)

ES_{CM} or RI Move the cursor up one row. If the cursor is at the top margin, the display scrolls down one line and a blank line is inserted.

Backward Index (DECBI)

ES_{C6} Backward index (VT400 mode only). Moves the cursor back one column. If the cursor is at the left margin, all display memory within the margins moves one column to the right and a new column is added at the left margin, with no visual attributes. The column shifted past the right margin is lost. If the cursor is at the left border of the page when the terminal receives DECBI, it is ignored.

Forward Index (DECFI)

ES_{C9} Forward index (VT400 mode only). Moves the cursor forward one column. If the cursor is at the right margin, all display memory within the margins moves one column to the left and a new column is added at the right margin, with no visual attributes. If the cursor is at the right border of the page when the terminal receives DECFI, the terminal ignores DECFI.

Cursor Movement (ANSI Mode)

These cursor movement control sequences can be used in either VT or ANSI mode.

<code>csI<n>e</code>	Move the cursor down <n> lines in the same column.
<code>csI<n>E</code>	Move the cursor down <n> lines to column 0.
<code>csI<n>a</code>	Move the cursor right <n> characters.
<code>csI<n>d</code>	Move the cursor to line <n> in the same column.
<code>csI<n>F</code>	Move the cursor up <n> lines to column 0.

Screen Display

Screen display control functions affect how the screen looks, whether to echo characters typed from the keyboard, and whether to display a status line.

Normal/Inverse Video (DECSCNM)

<code>csI?5h</code>	Set screen to inverse video—the screen background is light.
<code>csI?5l</code>	Set screen to normal video—the screen background is dark.

These control functions are ignored if ANSI color is used. The Reflection setup equivalent is the Reverse Background checkbox in the Display Setup dialog box. See page 243.

Scrolling Mode (DECSCLM)

<code>csI?4h</code>	Set smooth scrolling, limiting the speed at which new lines appear on the screen (this produces a slower scroll).
<code>csI?4l</code>	Set jump scrolling. Reflection adds lines to the display as fast as it receives them from the host.

The Scrolling Speed list box in the Video Options Setup dialog box controls scrolling at the hardware level. See page 247.

Set Number of Lines per Screen (DECSNLS)

$^cS_I<n>^*$ Sets the number of rows that Reflection displays on the screen. The value of $<n>$ can be in the range 24–49.

The Reflection setup equivalent is the Display Rows text box in the Display Setup dialog box. See page 240.

Local Echo (SRM)

$^cS_{I12h}$ Turn off local echo. Reflection sends characters only to the host, not to the display. If the host echoes characters, they appear on the display.

$^cS_{I12l}$ Turn on local echo. Characters entered from the keyboard are sent to both the host and the display. If the host echoes characters, the characters appear twice on your display.

The Reflection setup equivalent is the Local Echo check box in the Keyboard Setup dialog box. See page 270.

Multi-page Mode (no mnemonic)

$^cS_{I>1h}$ Data that scrolls off the screen is retained in display memory. This data can be brought back into view by the Scroll up, Scroll down, Previous page, Next page, Home up, and Home down functions.

$^cS_{I>1l}$ Data that scrolls off the screen is erased from display memory.

The Reflection equivalent is the RCL command SET MULTI-PAGE.

Status Line

The line at the bottom of the display is reserved for the status line. What row it is on depends on the number of display rows set. For example, if there are 42 rows configured, the status line is row 43.

Select Status Line Type (DECSSDT)

`CS_I0$~` Do not display the status line.

`CS_I1$~` Select an *indicator* status line. The last line of the display is shown in inverse video and displays the current page in page memory and the cursor position (row/column). In ReGIS graphics mode (Reflection 4 only), additional row and column numbers indicate the position of the graphics input cursor.

`CS_I2$~` Select a *host-writable* status line. The status line then acts as a one-line display that the host can write to. Most control functions that affect the main display also affect the status line.

If you change from an indicator to a host-writable status line, the new host-writable status line is empty.

The Reflection setup equivalent is Status Line group box in the Display Setup dialog box. See page 242.

Select Active Status Display (DECSASD)

`CS_I0$}` Select the main display as the active display. The main display is the top 24–49 lines, depending on how many lines Reflection is configured to display. The Reflection setup equivalent for configuring the number of lines is the Display Rows text box in the Display Setup dialog box. See page 240.

`CS_I1$}` Select the status line as the active display.

Controlling Display Format

The following functions let you change the width of the display, the height of the scrolling region, and whether the cursor can move outside the scrolling margins.

Select 80 or 132 Columns (DECCOLM)

When you switch between 80- and 132-column modes, data is cleared from page memory and the cursor moves to the upper-left corner. If the status line is host-writable, any data on it is also cleared.

Digital recommends the DECSCPP control function over DECCOLM because DECSCPP does not clear page memory or reset the scrolling regions. DECCOLM is supported for compatibility with earlier applications; DECSCPP is described below.

CS_I?3h Set the left margin to 1 and the right margin to 132. If you have a 132-column video adapter, or if you are running Reflection 2 bit-mapped (R2 /B132), the display is scaled and 132 columns can be show on the screen.

CS_I?3l Set the left margin to 1 and the right margin to 80.

The setup equivalent is Columns in the Display Setup dialog box. See page 237.

Select 80 or 132 Columns (DECSCPP)

CS_I\$| Sets each page of memory to 80 columns.

CS_I0\$|

CS_I80\$|

CS_I132\$| Sets each page of memory to 132 columns.

These control functions switch between 80- and 132-column modes. Note:

- ▲ When the number of columns is changed, the font changes accordingly.
- ▲ DECSCPP does not move the cursor. If the cursor is on a column that is beyond the width of the new page, it moves to the right-most column of the page.
- ▲ If you switch from 132- to 80-column pages, you can lose data from page memory: columns that are no longer in page memory are lost. Set page columns *before* entering data into page memory.

The Reflection setup equivalent is the Columns option in the Display Setup dialog box. See page 237.

Scrolling Region (DECSTBM)

$^{\text{CS}}\text{I}<\text{t}>;<\text{b}>\text{r}$ Set a scrolling region with a top margin at row $<\text{t}>$ and a bottom margin at row $<\text{b}>$. The scrolling region is the area between these margins that moves during vertical scrolling.

The $<\text{b}>$ parameter must be greater than $<\text{t}>$. Rows are counted from row 1 at the top of the display. After DECSTBM is sent, the cursor moves to column 1, line 1 of the display.

Omitting both parameters (that is, entering $^{\text{CS}}\text{IR}$) sets the margins to full screen. When the margins are set to full screen, lines that scroll off the top of the display are saved in display memory.

When margins are set, the following functions are disabled:

- ▲ Previous page
- ▲ Next page
- ▲ Scroll up/down
- ▲ Home up/down

Set Margins (DECSLRM)

$^{\text{CS}}\text{I}<\text{n1}>;<\text{n2}>\text{s}$

Set the left and right margins (VT400 mode only). DECSLRM homes the cursor on the current page. $<\text{n1}>$ is the column number of the left margin; $<\text{n2}>$ is the column number of the right margin. The default for $<\text{n1}>$ is 1, and the default for $<\text{n2}>$ is 80 or 132, depending on the page width. When $<\text{n1}>$ and $<\text{n2}>$ are set to a value other than the default, smooth scrolling is disabled.

The value of $<\text{n1}>$ must be less than the value of $<\text{n2}>$, and the maximum width of the scrolling region is the page width, based on the number of columns per page (DECSCPP).

This control function is only recognized if DECVSSM is set ($^{\text{CS}}\text{I?69h}$).

Enable Margin Setting (DECVSSM)

This sequence controls whether or not the DECSLRM control function can set margins (VT400 mode only).

- $^{CS_I?69h}$ Margins can be set by DECSLRM.
- $^{CS_I?69l}$ Margins cannot be set by DECSLRM.

Origin Mode (DECOM)

- $^{CS_I?6h}$ Set origin mode, making the home cursor position the upper-left corner of the display within the margins. The first row in the scrolling region is now row 1, and the cursor cannot move outside the margins.
- $^{CS_I?6l}$ Reset origin mode, making the home cursor position the upper-left corner of the screen. The first row on the screen is now row 1, and the cursor can move outside the margins.

Origin mode determines if the cursor is allowed to move outside the margins set by the DECSTBM function, or if it is restricted to movements within the margins. This allows cursor addressing relative to the scrolling margins or the complete display. When you start Reflection or do a soft reset ((**Ctrl**)-**F2**), origin mode is reset.

Display Controls (CRM)

- CS_I3h Display C0 and C1 control characters (such as ES_C and LF) instead of interpreting them.
- CS_I3l Set control codes to function normally; they are interpreted and not displayed. If control codes are being displayed, this function is first displayed, then interpreted.

The Reflection setup equivalent is the Control Chars group box in the Display Setup dialog box. See page 241.

The VT terminals do not support the CRM sequence for setting and resetting display controls. They only support the report sequence (DECRQM on page 618) for determining whether CRM is set or reset. Reflection, on the other hand, supports CRM for setting and resetting display controls, as well as DECRQM for determining the current setting of CRM.

Page Memory

The VT420 has off-screen memory for storing data entered from the keyboard or the host application. Up to 144 lines can be stored. These 144 lines are called *page memory*. By default, the terminal (and Reflection) uses 6 pages of 24 lines each.

Select Lines per Page (DECSLPP)

Sets the number of lines for each page in page memory.

Control Function	Lines per page	Set number of pages to...
c_{SI24t}	24	6
c_{SI25t}	25	5
c_{SI36t}	36	4
c_{SI48t}	48	3
c_{SI72t}	72	2
c_{SI144t}	144	1

The Reflection setup equivalent is the Page Memory Arrangement list box in the Advanced Display Setup dialog box. See page 244.

Next Page (NP)

Moves the cursor forward to the home position on one of the following pages in page memory. If there is only one page, this control function is ignored.

$c_{SI< n > U}$ $< n >$ is the number of pages to move forward. If $< n >$ is $\emptyset$ or 1, the cursor moves to the next page in page memory. If $< n >$ is greater than the number of pages, the cursor moves to the home position on the last page.

Previous Page (PP)

Moves the cursor backward to the home position on one of the preceding pages in page memory. If there is only one page, this control function is ignored.

$c_{SI< n > V}$ $< n >$ is the number of pages to move backward. If $< n >$ is $\emptyset$ or 1, the cursor moves to the preceding page in page memory. If $< n >$ is greater than the number of pages, the cursor moves to the home position on the first page.

Page Position Absolute (PPA)

Moves the cursor to the corresponding row and column on a page in page memory. If there is only one page, this control function is ignored.

$^{CS_I} \langle n \rangle < SP \rangle P$ $\langle n \rangle$ is the number of the page to which the cursor should move. If $\langle n \rangle$ is greater than the number of pages in memory, the cursor stops on the last page. If $\langle n \rangle$ is 0 or 1, the cursor stops on the first page.

Page Position Relative (PPR)

Moves the cursor forward to the corresponding row and column on a following page in page memory. If there is only one page, this control function is ignored.

$^{CS_I} \langle n \rangle < SP \rangle Q$ $\langle n \rangle$ is the number of pages to move the cursor forward. If $\langle n \rangle$ is greater than the number of following pages in page memory, the cursor stops on the last page.

Page Position Backward (PPB)

Moves the cursor backward to the corresponding row and column on a preceding page in page memory. If there is only one page, this control function is ignored.

$^{CS_I} \langle n \rangle < SP \rangle R$ $\langle n \rangle$ is the number of pages to move the cursor backward. If $\langle n \rangle$ is greater than the number of preceding pages in page memory, the cursor stops on the first page.

Pan Down (SU)

Moves the user window down a specified number of lines in page memory.

$^{CS_I} \langle n \rangle S$ $\langle n \rangle$ is the number of lines to move the user window down in page memory: $\langle n \rangle$ new lines appear at the bottom of the display and $\langle n \rangle$ scroll off the top of the display. You cannot pan past the bottom margin of the current page.

Pan Up (SD)

Moves the user window up a specified number of lines in page memory.

$^{CS_I} \langle n \rangle T$ $\langle n \rangle$ is the number of lines to move the user window up in page memory: $\langle n \rangle$ new lines appear at the top of the display and $\langle n \rangle$ scroll off the bottom of the display. You cannot pan past the top margin of the current page.

Horizontal Cursor Coupling (DECHCCM)

This control function determines whether the user window pans with the cursor when the cursor moves past the right or left border of the user window. DECHCCM is only useful when the width of the current user window is narrower than the page. The cursor must stay on the current page.

`CS_I?60h` Couples the cursor to the display.

By default the cursor is coupled to the display for horizontal movement. When the cursor moves past the right or left border of the user window, the window pans to keep the cursor in view.

If the cursor moves past the left border of the display, the user window pans to the left and new columns appear at the right border of the window.

`CS_I?60l` Uncouples the cursor from the display.

If the cursor is uncoupled from the display and is moved past the right or left border of the user window, the cursor disappears from view.

The Reflection setup equivalent is the Horizontal Coupling check box in the Advanced Display Setup dialog box. See page 246.

Vertical Cursor Coupling (DECVCCM)

This control function determines whether the user window pans with the cursor when the cursor moves past the top or bottom border of the user window. DECVCCM is only useful when the height of the current user window is smaller than the page. The cursor must stay on the current page.

`CS_I?61h` Couples the cursor to the display.

By default the cursor is coupled to the display for vertical movement. When the cursor moves past the top or bottom border of the user window, the window pans to keep the cursor in view.

If the cursor moves past the top of the display, the user window pans up and new lines appear at the top of the screen.

CS1?611 Uncouples the cursor from the display.

If the cursor is uncoupled from the display and is moved past the top or bottom border of the user window, the cursor disappears from view.

The Reflection setup equivalent is the Vertical Coupling check box in the Advanced Display Setup dialog box. See page 246.

Page Cursor Coupling (DECPCCM)

This control function determines if a new page appears in the display when the cursor moves to a new page. DECPCCM is only useful with a multiple-page format.

CS1?64h Couples the cursor to the display.

By default the cursor is coupled to the display when the cursor moves to a new page. The new page appears in the display to keep the cursor in view.

CS1?641 Uncouples the cursor.

If the cursor is uncoupled from the display and is moved to a new page, the cursor disappears from view.

The Reflection setup equivalent is the Page Coupling check box in the Advanced Display Setup dialog box. See page 246.

Rectangular Area Operations

These control functions allow you to manipulate rectangular areas of text within page memory.

You can:

- ▲ Copy them from one area in page memory to another.
- ▲ Erase them.
- ▲ Fill them with a character of your choice.
- ▲ Change or reverse their visual character attributes.

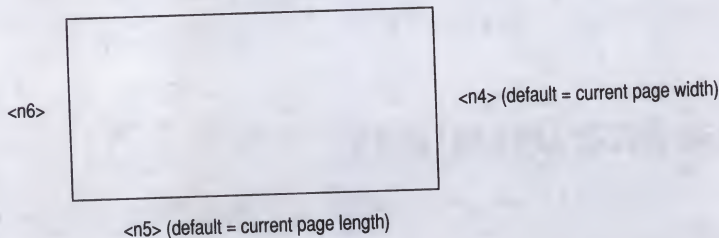
Request Memory Checksum (DECRQCRA)

$^c s_I \langle n1 \rangle; \langle n2 \rangle; \langle n3 \rangle; \langle n4 \rangle; \langle n5 \rangle; \langle n6 \rangle * y$

Requests a memory checksum of a rectangular area on a specified page (VT400 mode only). Reflection returns a checksum report (DECCKSR) in response. DECRQCRA also works on the status line.

- $\langle n1 \rangle$ A numeric label you give to identify the checksum request (the report—DECCKSR—returns this number).
- $\langle n2 \rangle$ The number of the page on which the rectangular area is located. If $\langle n2 \rangle$ is 0 or omitted, Reflection ignores the remaining parameters and reports a checksum for all pages in page memory. If $\langle n2 \rangle$ is higher than the number of pages, Reflection does a checksum on the last page.
- $\langle n3 \rangle - \langle n5 \rangle$ The parameters $\langle n3 \rangle$ through $\langle n5 \rangle$ are the top, right, bottom, and left borders of the rectangular area. $\langle n3 \rangle$ must be less than or equal to $\langle n5 \rangle$; $\langle n4 \rangle$ and $\langle n6 \rangle$ are column numbers: $\langle n6 \rangle$ must be less than or equal to $\langle n4 \rangle$. Without these parameters, Reflection returns a checksum of page $\langle n2 \rangle$.

$\langle n3 \rangle$ (default = 1)



The coordinates are affected by the setting of origin mode (DECOM).

Request Memory Checksum of Macros (DECCKSR)

$^c s_I ? 63; \langle n \rangle n$

DSR request for a memory checksum report of current text macro definitions. $\langle n \rangle$ is an optional numeric parameter that provides a label to identify the checksum request.

DECCKSR Response

$D_{CS}^{<n>!} \sim D \dots D_{ST}$

Response to memory checksum request (DECCKSR). $<n>$ is a label indicating which DSR request the report is for. $D \dots D$ is the data string: four hexadecimal digits indicating the checksum.

Copy Rectangular Area (DECCRA)

$CS_I^{<n1>;<n2>;<n3>;<n4>;<n5>;<n6>;<n7>;<n8>\$v}$

Copies a rectangular area of display memory from one part of page memory to another. Characters and their attributes remain unchanged. The parameters $<n1>$ through $<n5>$ describe the area to be copied:

- $<n1>$ Top line
- $<n2>$ Left column
- $<n3>$ Bottom line
- $<n4>$ Right column
- $<n5>$ Page number

The parameters $<n6>$ through $<n8>$ describe where the area should be copied:

- $<n6>$ Top line
- $<n7>$ Left column
- $<n8>$ Page number

Erase Rectangular Area (DECERA)

$CS_I^{<n1>;<n2>;<n3>;<n4>\$z}$

Erases the characters (and their visual attributes) in the specified rectangular area and replaces each one with a space (decimal 32). Line attributes (for example, the attributes that specify double-wide, double-high characters) are not erased. Area to erase:

- | | | | |
|--------|-------------|--------|--------------|
| $<n1>$ | Top line | $<n3>$ | Bottom line |
| $<n2>$ | Left column | $<n4>$ | Right column |

Fill Rectangular Area (DEC FRA)

$cs_I<n1>;<n2>;<n3>;<n4>;<n5>\x

Fills an area in display memory with a specified character. The fill character takes on the visual attributes set by the last SGR control function, not the attributes of the characters that it replaces. Current line attributes (for example, the attributes that specify double-wide, double-high characters) remain unchanged. Parameters:

$<n1>$ Decimal code of fill character

$<n2>$ Top line

$<n3>$ Left column

$<n4>$ Bottom line

$<n5>$ Right column

Selective Erase of Rectangular Area (DEC SERA)

$cs_I<n1>;<n2>;<n3>;<n4>\$\{$

Parameters:

$<n1>$ Top line $<n3>$ Bottom line

$<n2>$ Left column $<n4>$ Right column

Select Attribute Change Extent (DEC SACE)

$cs_I<n>*\$x$

Use this control function to select which character positions within a rectangular area can have their attributes changed or reversed. The DECSACE control function affects the rectangular area control functions for changing and reversing attributes (DECCARA and DECRARA).

$<n>$ The $<n>$ parameter specifies what character positions are affected. 0 or 1 indicates a stream of character positions that begins in the first position specified in the DECCARA or DECRARA control function, and ends with the second one that is specified. A 2 indicates a rectangular area of character positions; the DECCARA and DECRARA control functions specify the top left and bottom right corners of the area.

Change Attributes in Rectangular Area (DECCARA)

`csI<n1>;<n2>;<n3>;<n4>;<n5>...<nn>$r`

Lets you change the visual attributes for characters in a specified area of display memory—the characters themselves remain unchanged. The DECSACE control function is used to determine whether all or just some of the character positions are affected. The parameters are:

<code><n1></code>	Top line
<code><n2></code>	Left column
<code><n3></code>	Bottom line
<code><n4></code>	Right column
<code><n5>...<nn></code>	Visual character attributes

Reverse Attributes in Rectangular Area (DECRARA)

`csI<n1>;<n2>;<n3>;<n4>;<n5>...<nn>$t`

Lets you reverse the visual attributes for characters in a specified area of display memory—the characters themselves remain unchanged. The DECSACE control function is used to determine whether all or just some of the character positions are affected. Reversing a visual attribute means toggling it: if bold is on, it is toggled off, if underlining is off, it is toggled off, and so on. The parameters are:

<code><n1></code>	Top line
<code><n2></code>	Left column
<code><n3></code>	Bottom line
<code><n4></code>	Right column
<code><n5>...<nn></code>	Visual character attributes

Macro Support

The VT420 lets you define and invoke macros to suit the needs of your application. A macro is a string of text and commands downloaded to the terminal. By invoking the macro, you can execute a group of control functions with one operation.

Define Macro (DECDMAC)

$D^C_S<n1>;<n2>;<n3>!zD\dots D^S_T$

In VT400 mode you can define macros that are interpreted as normal input. The amount of memory available for macros is determined by the Macro Storage text box in the General Setup dialog box.

Any macro definitions that do not fit into the memory allotted (6K by default in Reflection 2, and 10K in Reflection 4) are ignored.

An RIS or DECSR clears all macro definitions. A soft reset (DECSTR) has no effect.

The parameters are:

- $<n1>$ Macro ID number (0–63). If you give a macro an ID number that already exists, the old macro definition is deleted and the new one is used. If $<n1>$ exceeds 63, Reflection ignores this control function.
- $<n2>$ Determines how a new macro definition is treated: If $<n2>$ is 0 or omitted, an old macro with the same macro ID number is deleted. If $<n2>$ is 1, DECDMAC deletes all current macro definitions before defining this macro. If $<n2>$ is a number that is not 0 or 1, the macro is ignored.
- $<n3>$ Selects the encoding format for the text of the macro definition: if $<n3>$ is 0 or omitted, ASCII text is used in the macro. If $<n3>$ is 1, hex pairs are used (each pair of characters in the macro is the hex value for a single ASCII character. If $<n3>$ is a number that is not 0 or 1, the macro is ignored.
- $D\dots D$ The string of text and control functions to be performed when the macro is invoked. If hex pairs are used, you can also use a repeat introducer (!) in $D\dots D$. The repeat introducer lets you repeat any

hex pair in the definition string any number of times. Embed the repeat sequences in *D...D*.

The format for a hex string with a repeat introducer is as follows: *!<n>;D...D*, where *<n>* is the number of times to repeat the sequence. If *<n>* is omitted, the sequence is repeated only once. *D...D* is the sequence of hex pairs to be repeated. For example, the following sequence defines a macro that displays the ASCII string "Command Language Manual":

```
EScP1;0;0!zCommand Language ManualESc\
```

To invoke the macro, use ^ESc[1*z, or use the Reflection command `DISPLAY "^[[1*z"`.

Invoke Macro (DECINVM)

^CS_I<n>*z Invokes a stored macro (VT400 mode only). *<n>* is the macro ID number used in DECDMAC. If *<n>* is not associated with a particular macro, Reflection ignores this control function. If a macro definition includes control functions, these functions remain in effect after the macro is invoked.

Request Macro Report (DECMSR)

^CS_I?62n DSR request for a macro space report (VT400 mode only).

Macro Space Report (no mnemonic)

^CS_I<n>{* *<n>* is the number of bytes divided by 16 (rounded down).

Editing

You can insert and delete data in the scrolling region—the area on the screen between the top and bottom margins. (Use the DECSTBM control function on page 558 to set the scrolling region.)

Insert/Replace Mode (IRM)

- C_{SI4h} Insert mode. Characters are inserted at the cursor position, and all characters to the right of the cursor move one column to the right.
- C_{SI4l} Replace mode. Characters replace characters at the cursor position.

Delete Line (DL)

- $C_{SI<n>M}$ Delete $<n>$ lines at the cursor position and shift lower lines up. Blank lines with normal character attributes are added at the bottom of the scrolling region.

Insert Line (IL)

- $C_{SI<n>L}$ Insert $<n>$ blank lines at the cursor position.

Delete Character (DCH)

- $C_{SI<n>P}$ Delete $<n>$ characters, starting with the cursor position and then deleting characters to the right. As characters are deleted, characters to the right of the cursor move left.

Insert Character (ICH)

- $C_{SI<n>e}$ Insert $<n>$ space characters before the cursor position on the current line only. This function is available only in VT200 mode and above.

Insert Column (DECIC)

- $C_{SI<n>'}$ Insert column (VT400 mode only). Inserts $<n>$ columns in the scrolling region, beginning with the column that the cursor is in. As columns are inserted, the columns between the cursor and the right margin move to the right. Reflection inserts blank columns with no visual character attributes. DECIC has no effect outside of the scrolling margins.

Erasing Text

The erase text functions can affect data inside or outside the scrolling region: they are not restricted by margins.

Erase in Display (ED)

- C_{SI0J} Erase from the cursor to the end of the display.
- C_{SI1J} Erase from the top of the display to the cursor.
- C_{SI2J} Erase the portion of display or page memory that is current (the screen the cursor is on).

Erase in Line (EL)

- C_{SI0K} Erase from the cursor position to the end of the line.
- C_{SI1K} Erase from the beginning of the line to the cursor position.
- C_{SI2K} Erase the entire line the cursor is on.

The EL functions erase characters on the line the cursor is on, clearing all character attributes from the erased character positions.

Erase Character (ECH)

- $C_{SI<n>X}$ Erase $\langle n \rangle$ characters from the cursor position to the right (without moving the cursor). A value of 0 or 1 erases one character. ECH clears character attributes from erased cursor positions. ECH is available only in VT200 mode and above.

Delete Column (DECDC)

- $C_{SI<n>'~}$ Delete column (VT400 mode only). Deletes $\langle n \rangle$ columns in the scrolling region, beginning with the column that the cursor is in. As columns are deleted, the remaining columns between the cursor and the right margin move to the left. Reflection adds blank columns with no visual character attributes at the right margin. DECDC has no effect outside of the scrolling margins.

Selectively Erasing Text—VT200 Mode and Above

With selective erase, you can only erase characters defined as erasable. These control functions do not affect visual character attributes set by SGR.

Select Character Protection Attribute (DECSCA)

- | | |
|--------------|--|
| $c_{SI0} "q$ | Characters following either of these control functions are erased |
| $c_{SI2} "q$ | by the selective erase control functions DECSED and DECSEL. |
| $c_{SI1} "q$ | Protect characters from erasure by the selective erase control functions DECSED and DECSEL. The characters can still be erased by a normal erase sequence. |

The selective erase control functions DECSED and DECSEL (below) cannot erase characters defined as not erasable by DECSCA.

Selective Erase in Display (DECSED)

- | | |
|--------------|--|
| $c_{SI?0} J$ | Erase unprotected characters from the cursor position to the end of the display. |
| $c_{SI?1} J$ | Erase unprotected characters from the top of the display to the cursor position. |
| $c_{SI?2} J$ | Erase unprotected characters from the entire display. |

DECSED erases only those characters in the display that are defined as erasable by the DECSCA function; text in display memory remains.

Selective Erase in Line (DECSEL)

- | | |
|--------------|---|
| $c_{SI?0} K$ | Erase unprotected characters from the cursor position to the end of the line. |
| $c_{SI?1} K$ | Erase unprotected characters from the beginning of the line to the cursor position. |
| $c_{SI?2} K$ | Erase unprotected characters from the entire line. |

DECSEL erases only those characters in the current line that are defined as erasable by the DECSCA control function.

Keyboard

Keyboard control functions affect actions that lock and unlock the keyboard, cause keystrokes to repeat automatically, and perform other keyboard-related functions.

Keyboard Action Mode (KAM)

- $C_{SI}2h$ Lock the keyboard so it cannot send characters to the host. If the functions key labels are showing, a “K” appears on the status line (or between labels four and five) while the keyboard is locked, and the PC ignores all keystrokes that normally send characters to the host. Typing while the keyboard is locked causes Reflection to beep.
- $C_{SI}2l$ Unlock the keyboard.

Linefeed/New Line Mode (LNM)

- $C_{SI}20h$ Turn on new line mode. When you press **Enter**, Reflection sends both a carriage return and a linefeed. When Reflection receives a linefeed, form feed, or vertical tab, it moves the cursor to the first column of the next line.
- $C_{SI}20l$ Turn off new line mode (turn off linefeed mode). The **Enter** key sends only a C_R character. A received L_F , F_F , or V_T character moves the cursor down one line in the current column.

The Reflection setup equivalent is the New Line check box in the General Setup dialog box. See page 236.

Autorepeat Mode (DECARM)

- $C_{SI}78h$ Turn on autorepeat. When a key is held down, it repeatedly sends a character until released.
- $C_{SI}78l$ Turn off autorepeat.

The Reflection setup equivalent is the Autorepeat check box in the Keyboard Setup dialog box. See page 269.

Autowrap Mode (DECAWM)

- $c_{SI?7h}$ Enable autowrap mode. Received characters automatically wrap to the next line when the cursor reaches the right margin of the display.
- $c_{SI?7l}$ Disable autowrap mode. When the cursor reaches the right margin, it does not move. Additional characters overwrite the character at the right margin until the cursor is moved explicitly.

The Reflection setup equivalent is the Autowrap check box in the Display Setup dialog box. See page 242.

Control LEDs (no mnemonic)

- $c_{SI<n>q}$ Controls the simulated LEDs that appear on the pf key labels, in the **F8** position, as follows:

Values for Controlling LEDs (<n>)

Value	Meaning	Value	Meaning
Ø	Clear all LEDs	3	Turn on LED 3
1	Turn on LED 1	4	Turn on LED 4
2	Turn on LED 2		

Cursor Keys Mode (DECCKM)

- $c_{SI?1h}$ Cursor keys (that is, the arrow keys) send special application sequences.
- $c_{SI?1l}$ Cursor keys send normal cursor positioning sequences.

The codes sent by the cursor keys are listed on page 577. The Reflection setup equivalent is the Cursor Keys option in the General Setup dialog box. See page 234.

Keypad Mode (DECKPAM and DECKPNM)

- $e_{SC=}$ Numeric keypad keys send application escape sequences.
- $e_{SC>}$ Numeric keypad keys send numeric characters.

The codes sent by the keys on the keypad are listed on page 579. The Reflection setup equivalent is the Keypad option in the General Setup dialog box. See page 234.

Numeric Keypad Mode (DECNKM)

`CS_I?66h` Set the numeric keypad to application mode.

`CS_I?66l` Set the numeric keypad keys to normal mode.

This control function works like the DECKPAM and DECKPNM functions above; it's provided mainly for use with the request and report modes (DECRQM on page 618 and DECRPM on page 619).

Backarrow Key Mode (DECBKM)

`CS_I?67h` The Backspace key functions as backspace (decimal 8).

`CS_I?67l` The Backspace key functions as delete (ASCII decimal 127).

The Reflection setup equivalent is the Backspace Key Sends option in the Keyboard Setup dialog box. See page 268.

User-Defined Keys

Using the DECUDK device control string, you can define the codes sent by the function keys. These keys are called *user-defined keys*, or UDKs. Once created, you activate a UDK by pressing Shift-<key>, where <key> is the function key you defined.

A total of 256 bytes is available for all UDKs. When all 256 bytes are used, you cannot define any more keys until you clear some space. To clear space:

- ▲ Use DECUDK to redefine one or more UDKs
- ▲ Use DECUDK to clear existing UDKs
- ▲ Clear all UDKs with a power-up or RIS operation (see page 626)

Note: UDKs are available only in VT200 mode and above. ▲

User-Defined Keys (DECUDK)

${}^D C_S < C >; < L > | < def1 >; < def2 >; \dots; < defn > {}^S T$

The control string that loads a user-defined key.

<C> The clear parameter. 0 clears all UDK definitions before loading new values. 1 clears one key at a time, as each new UDK value is loaded.

<L> The lock parameter. 0 locks the UDK definitions against future redefinition. 1 does not unlock the keys, it simply does not lock them. Once you lock UDKs, the only way to unlock them is by clearing the User-Defined Keys Locked check box in the General Setup dialog box. The <L> parameter is linked to this check box (see page 236).

| The final character, identifying the control string as a DECUDK sequence.

<defn> The definition for each UDK being defined. It has the following format:

$< \text{key identifier} > / < \text{key definition} >$

You include the definition between the final character (|) and the ${}^S T$. Each key consists of a key identifier (listed in the table below) and a key definition (explained below), separated by a forward slash. A semicolon separates UDK definitions. See the examples on page 577.

Key Identifiers

Key	Identifier	Key	Identifier
F6	17	F14	26
F7	18	F15	28 (Help)
F8	19	F16	29 (Do)
F9	20	F17	31
F10	21	F18	32
F11	23	F19	33
F12	24	F20	34
F13	25		

The <key definition> is a string of hex pairs that represent the ASCII hex codes for the characters in the key definitions. (See page 638 for an ASCII character chart showing hex codes.) For example, the hex coding for DIR is as follows:

44 = D
49 = I
52 = R
ØD = C_R

A valid UDK definition of VT (Shift)-(F11)—the equivalent PC keystroke is (Alt)-(left)(Shift)-(Q)—to generate a directory listing on the VAX is:

^DCsØ;1|23/444952ØD^ST

There must be an even number of hex digits (in the example above there are eight), or the whole sequence is ignored.

As another example, the following sequence clears all previous UDK definitions, loads (F6) with the string EDIT and (F8) with the string COPY^C_R, and does not lock the new definitions.

^DCsØ;1|17/45444954;19/434F5059ØD^ST

Keyboard Codes

The following tables list the control functions sent by the arrow keys, editing and function keys, and numeric keypad.

Codes Sent by the Arrow Keys

The following table shows the codes sent by the arrow keys when the DECCKM function is set to normal cursor keys or application cursor keys. (See page 574 for information about the DECCKM control function.) The codes sent in ANSI mode apply only to VT100 through VT300 modes; the VT52 terminal is not compatible with ANSI mode.

Key	ANSI Mode		VT52 Mode
	Cursor	Application	Cursor or Application
↑	C _S IA	S _S 3A	E _S cA
↓	C _S IB	S _S 3B	E _S cB
→	C _S IC	S _S 3C	E _S cC
←	C _S ID	S _S 3D	E _S cD

Codes Sent by the Editing and VT Function Keys

The following table shows the codes sent by the six editing keys and the function keys along the top of the keyboard when in VT200 mode or higher.

VT Keystroke	Generated Code
Find	CsI1~
Insert Here	CsI2~
Remove	CsI3~
Select	CsI4~
Prev Screen	CsI5~
Next Screen	CsI6~
F1	CsI11~
F2	CsI12~
F3	CsI13~
F4	CsI14~
F5	CsI15~
F6	CsI17~
F7	CsI18~
F8	CsI19~
F9	CsI20~
F10	CsI21~
F11	CsI23~ (Esc in VT52/VT100 modes)
F12	CsI24~ (Bs in VT52/VT100 modes)
F13	CsI25~ (LF in VT52/VT100 modes)
F14	CsI26~
F15 (Help)	CsI28~
F16 (Do)	CsI29~
F17	CsI31~
F18	CsI32~
F19	CsI33~
F20	CsI34~

Codes Sent by the Numeric Keypad

The following table shows the codes sent by the numeric keypad keys when the keypad mode functions DECKPAM and DECKPNM are used (see page 574). The codes sent in ANSI mode apply only to VT100 through VT300 modes; the VT52 terminal is not compatible with ANSI mode.

Key	ANSI Mode		VT52 Mode	
	Numeric	Application	Numeric	Application
Ø	Ø	S_{S3P}	Ø	$E_{SC?P}$
1	1	S_{S3Q}	1	$E_{SC?Q}$
2	2	S_{S3R}	2	$E_{SC?R}$
3	3	S_{S3S}	3	$E_{SC?S}$
4	4	S_{S3T}	4	$E_{SC?T}$
5	5	S_{S3U}	5	$E_{SC?U}$
6	6	S_{S3V}	6	$E_{SC?V}$
7	7	S_{S3W}	7	$E_{SC?W}$
8	8	S_{S3X}	8	$E_{SC?X}$
9	9	S_{S3Y}	9	$E_{SC?Y}$
-	(minus)	S_{S3M}	-	$E_{SC?M}$
,	(comma)	S_{S3L}	,	$E_{SC?L}$
.	(period)	S_{S3N}	.	$E_{SC?N}$
Enter *	C_R or $C_{R^{LF}}$	S_{S3M}	C_R or $C_{R^{LF}}$	$E_{SC?M}$
PF1	S_{S3P}	S_{S3P}	E_{SCP}	E_{SCP}
PF2	S_{S3Q}	S_{S3Q}	E_{SCQ}	E_{SCQ}
PF3	S_{S3R}	S_{S3R}	E_{SCR}	E_{SCR}
PF4	S_{S3S}	S_{S3S}	E_{SCS}	E_{SCS}

* The LNM function determines the characters sent by the Return key (either a C_R or a $C_{R^{LF}}$).

Printer Control

The printer control functions select the printer mode, the screen region to print, and other options for printing to a local printer. Many of these functions have an equivalent field in the Printer Setup dialog box. If the Printer Interface list box is set to *FILE*, data is printed to a disk file rather than being sent to the printer; see page 276 for more information.

Printer Extent Mode (DECPEX)

This control function affects what is printed when a print screen is done.

`CS_I?19h` Print the entire screen in a print-screen operation.

`CS_I?19l` Print just the scrolling region (data inside the top and bottom margins) during a print-screen operation. The scrolling region is defined by the DECSTBM function (page 558).

The Reflection setup equivalent is the Print Region option in the Printer Setup dialog box. See page 282.

Print Display

This control function prints the data on the screen, regardless of how printer extent mode (DECPEX) is set.

`CS_I?10i` Print the entire screen.

Print All Pages

This control function prints all of page memory. If a form feed is set (DECPFF), Reflection sends a form feed after printing each page.

`CS_I?11i` Print all pages in page memory. If, for instance, the page memory arrangement is 4 pages of 36 lines each, then this control function prints 4 pages of 36 lines each.

Form Feed after Printing (DECPFF)

`CS_I?18h` Send a form feed to the printer after printing a file, the display, or display memory.

$c_{SI?181}$ Do not send a form feed to the printer after printing.

The Reflection setup equivalent is the Auto Form Feed check box in the Printer Setup dialog box. See page 279.

Media Copy (MC)

$c_{SI?5i}$ Turn on auto print mode (also called *log to printer*). Data received into display memory, either from datacomm or from the keyboard, is sent to a local printer (that is, a PC printer) one line at a time.

Lines must be delimited by a linefeed (L_F), form feed (F_F), or vertical tab (V_T) to be recognized as lines. The delimiting character is also sent to the printer.

$c_{SI?4i}$ Turn off auto print mode, and return to normal print mode.

The Reflection setup equivalent is the Print Mode option in the Printer Setup dialog box. See page 280.

Printer Controller Mode (MC)

c_{SI5i} Turn on printer controller mode (also called *pass through mode*). In this mode, all characters, data received from datacomm, and control sequences are sent directly to the printer, without appearing on the display. All codes except N_{UL} , D_{C1} , D_{C3} , and the c_{SI5i} and c_{SI4i} control functions are passed to the printer.

c_{SI4i} Turn off printer controller mode, and return to normal print mode.

The Reflection setup equivalent is the Print Mode option in the Printer Setup dialog box. See page 280.

Print Screen (MC)

c_{SIi} or c_{SI0i} If the printer extent mode (DECPEX) is set to the *scrolling region*, only the scrolling region is printed; otherwise, a text print screen of the visible display is done (not including page and display memory). If the Auto Form Feed check box in the Printer Setup dialog box is selected, a F_F is sent to the printer after the print operation.

Print Line (MC)

$^{\text{CS}}\text{I?1i}$ Print the line that currently contains the cursor.

Graphics Printing

The following control functions are for printing graphics. They apply only if you have Reflection 4.

Expanded/Compressed Print Mode (DECGEPM)

$^{\text{CS}}\text{I?43h}$ Select an expanded image for a graphics print screen.

$^{\text{CS}}\text{I?43l}$ Select a compressed image for a graphics print screen.

The Reflection setup equivalent is the Print Mode option in the Graphics Printing Setup dialog box. See page 265.

Print Rotated/Compressed Mode (DECGRPM)

$^{\text{CS}}\text{I?47h}$ Send a graphics image to the printer rotated 90 degrees.

$^{\text{CS}}\text{I?47l}$ Send a compressed image to the printer. This performs the same function as the $^{\text{CS}}\text{I?43l}$ sequence described above.

The Reflection setup equivalent is the Print Mode option in the Graphics Printing Setup dialog box. See page 265.

Print Color/Black and White Mode (DECGPCM)

$^{\text{CS}}\text{I?44h}$ Send a color image to the printer for a graphics print screen.

$^{\text{CS}}\text{I?44l}$ Send a black and white image to the printer for a graphics print screen.

The Reflection setup equivalent is the Color Printing option in the Graphics Printing Setup dialog box. See page 266.

Print Color Syntax (DECGPCS)

- $^c s_I ? 45h$ Select the RGB color format for a graphics print screen.
- $^c s_I ? 45l$ Select the HLS color format for a graphics print screen.

The Reflection setup equivalent is the Color Specification option Graphics Printing Setup dialog box. See page 267.

Print Background (DECGPBM)

- $^c s_I ? 46h$ Send the entire graphics image, including the background, to the printer for a graphics print screen.
- $^c s_I ? 46l$ Send the graphics image, except for the background, to the printer for a graphics print screen.

This function applies only when the DECGPCM function described above is set to send a color image. The Reflection setup equivalent is the Print Background check box in the Graphics Printing Setup dialog box. See See page 267.

Send Graphics to Host/Printer (MC)

- $^c s_I ? 2i$ Send graphics images to the host when a ReGIS hard copy command is issued, or when a graphics selection is printed using Reflection's printing commands. (The hard copy command is an option of the screen command.)
- $^c s_I ? i$ or $^c s_I ? 0i$ Send graphics images to the printer when a ReGIS hard copy command is issued.

The ReGIS hard copy command is an option of the screen command, described in the "Screen" chapter of the Reflection *Advanced Topics* manual). The Reflection setup equivalent is the Destination option in the Graphics Printing Setup dialog box. See page 266.

ReGIS Graphics (Reflection 4)

The following table shows the 8-bit device control strings and their 7-bit escape sequence equivalents for entering and exiting ReGIS. These sequences are valid only for Reflection 4.

ReGIS Device Control Strings

Device Control String	7-Bit Equivalent	Meaning
D _{CSP} or D _{CS0P}	ESC _{PP} or ESC _{P0P}	Enters ReGIS at the same point in the command as when last exited. ReGIS commands are not displayed.
D _{CS1P}	ESC _{P1P}	ReGIS begins at a new command. ReGIS commands are not displayed.
D _{CS2P}	ESC _{P2P}	Enters ReGIS at the same point in the command as when last exited. ReGIS commands are displayed.
D _{CS3P}	ESC _{P3P}	ReGIS begins at a new command. ReGIS commands are displayed.
S _T	ESC\	Exits ReGIS mode.*

Enter/Exit Graphics

C _{SI} >99h	Enter graphics mode.
C _{SI} >99l	Exit graphics mode.

* The character used to exit ReGIS is the same as the default literal escape character in Reflection command language. If you use the DISPLAY command in a command file to create and display ReGIS graphics locally, use a double backslash (\\) to exit ReGIS (the sequence ESC\\), or use the SET LITERAL-ESCAPE command to change the literal escape character. See the Reflection *Command Language* manual for more information about literal escape.

Tektronix Mode

$C_{SI} ? 38h$	Reflection enters Tektronix mode.
$C_{SI} ? 38l$	Reflection exits Tektronix mode.
$E_{SC}^{S_{UB}}$	Enter GIN mode. Puts the terminal in GIN mode, displays the crosshair cursor, and sets the bypass condition.
$E_{SC}^{E_{TB}}$	Graphics print screen. Initiates graphics print screen function, and clears the bypass condition.
$E_{SC}^{F_F}$	Page (erase display). Erases the display, sets the terminal to alphanumeric mode, homes the alpha cursor, sets the margin to position 0, and clears the bypass condition. This is functionally the same as pressing [Alt]-[P] on the keyboard.
$E_{SC}^{C_{AN}}$	Sets the bypass condition.
$E_{SC}^{E_{NQ}}$	Status request. Requests information from the terminal and sets the bypass condition. See the GIN mode description in "4014 Mode Characteristics" in the Reflection <i>Advanced Topics</i> manual.
$E_{SC} ?$	Interpreted as an ASCII DEL character.

Tektronix Raster Writing Modes

Tektronix terminals let you erase portions of the graphics image by fading them out. VT graphics terminals are unable to do a fade-out, so their Tektronix emulation includes a feature called *raster writing mode*. These different drawing modes (especially *dots off*) are used to selectively erase a part of the graphics image.

$E_{SC} / 0d$	Sets the drawing mode to <i>dots on</i> , which is the normal drawing mode. Lines are drawn by turning pixels on.
$E_{SC} / 1d$	Sets the drawing mode to <i>dots off</i> ; lines are drawn by turning pixels off.
$E_{SC} / 2d$	Sets the drawing mode to <i>complement dots</i> ; pixels that are on are turned off, and pixels that are off are turned on.

Sixel Graphics

A *sixel* is a vertical column of six display pixels, using six bits of an 8-bit character code. Each pixel, the smallest display unit on the screen, can be set either on (1) or off (0).

Sixels are typically used to create and print graphics images, and design character sets and fonts. When you print a ReGIS graphics screen in Reflection 4, for example, the screen is recorded as a series of sixels, which are then sent to a printer as a bitmap.

The Graphics Printing Setup dialog box lets you control various sixel printing options; see page 264 for details.

If you use sixels to design character sets and fonts, you can then download them as a soft character set; see page 600 for information about defining a soft character set.

This section contains information about the sixel data format and sixel control functions. Unless you use sixels to create graphics images pixel by pixel, you would typically not need to know this information.

Sixel Data Format

$^D C_s P_{n1}; P_{n2}; P_{n3}; q \ s \dots s^T$

The sixel data format. The semicolons (;) separate parameters in the control string.

P_{n1} The pixel aspect ratio parameter. Values for P_{n1} are listed in the following table. An aspect ratio of 2:1 means that each dot drawn is 2 pixels high by 1 pixel wide. This parameter is ignored by level 1 printers; they always use the default ratio of 2:1.

Parameter	Aspect Ratio
(omitted)	2:1 (default)
0, 1	2:1
2	5:1
3, 4	3:1
5, 6	2:1
7, 8, 9	1:1

Pn2 Select how the background color is drawn.

Parameter	Meaning
Ø or 2	Pixels that are set to Ø (off) are set to the current background color (the default).
1	Pixels that are set to Ø (off) remain at their current color.

Pn3 The horizontal grid size parameter. The VT300 has a fixed grid size, and this parameter is ignored.

q The final character. This identifies the control string as a sixel command.

s...s The string of sixel data. Each character must be in the range ? (hex 3F) to ~ (hex 7E). Each character represents six vertical pixels whose binary value equals the character code minus hex 3F. The least significant bit is at the top. The data string can also contain sixel control functions.

Sixel Graphics Levels

When sixel data is sent to the host, the format of the data string depends on the Graphics Level setting in the Graphics Printing Setup dialog box (see page 266):

- ▲ When Graphics Level is *Level 1*, Reflection sends sixel data using the following 7-bit format:

$^{ESCP} 1q s...s^{ESC\}$

ESCP and $^{ESC\}$ are the 7-bit equivalents for the DCS and ST characters.

- ▲ When Graphics Level is *Level 2*, Reflection send sixel data using the following format:

$^{ESCP} Pn1;Pn2;Pn3;q"Pan;Pad;Ph;Pv s...s^{ESC\}$

The parameters *Pn1*, *Pn2*, and *Pn3* are as explained above. The parameters *Pan*, *Pad*, *Ph*, and *Pv* are the raster attributes introduced by the " character, as explained in the next section.

- ▲ When Graphics Level is *LA210*, Reflection uses the same sixel data format as *Level 1* for compressed printing.

For expanded and rotated printing, the following format is used:

$^{ESCP} 9q s...s^{ESC\}$

The parameter 9 specifies a 1:1 aspect ratio.

Sixel Control Functions

In the data string that is part of the sixel device control string above, control functions can be included to repeat graphics, change raster attributes, and select colors.

`!Pn<character>` Graphics repeat introducer.

The `!` character is a graphics repeat introducer, causing `<character>` to be repeated `Pn` times. The character to repeat must be in the range `?` (hex 3F) to `~` (hex 7E).

`"Pan;Pad;Ph;Pv` Raster attributes.

The `"` character sets sixel raster attributes. `Pan` is the pixel aspect ratio numerator, and `Pad` is the pixel aspect ratio denominator. `Ph` and `Pv` define the size of the image in horizontal and vertical pixels (this does not limit the size of the sixel image, however).

`#Pc;Pu;Px;Py;Pz` Color introducer.

The `#` character is the color introducer. When only the first parameter is specified, this function selects color map entry `Pc`. When the remaining parameters are included, the function loads color map entry `Pc` with HLS or RGB colors. `Pu` indicates the color coordinate system: `1` indicates HLS values; `2` indicates RGB values. `Px` specifies either a hue or red intensity, depending on the coordinate system, `Py` specifies a lightness or green intensity, and `Pz` specifies a saturation or blue intensity.

`$` Graphics carriage return.

The `$` character is a graphics carriage return, returning the active position to the left margin of the same sixel line. This is used to overprint a line of sixels.

`-` Graphics new line.

The `-` character returns the active position to the left margin of the next sixel line.

Sixel Scrolling

When sixel scrolling is enabled, the sixel image begins at the top left of the active text position. A sixel image will scroll the display when the image reaches the bottom margin of the display (the image may also scroll off the top of the display). A graphics new line character (-) is sent immediately after the sixel dump, and the text cursor is set at the same position as the sixel cursor upon exiting graphics mode.

With sixel scrolling disabled, the sixel image begins at the top left of the display. When the image reaches the bottom margin, the display does not scroll, and additional sixel commands are ignored. Upon exiting graphics mode, the text cursor is set at the same position as when graphics mode was entered.

Enable/Disable Sixel Scrolling (DECSDM)

`CS_I?80l` Enable sixel scrolling.

`CS_I?80h` Disable sixel scrolling.

The Reflection setup equivalent is the Enable Sixel Scrolling check box in the ReGIS Setup dialog box. See page 258.

Graphics Mouse Buttons

In Reflection 4, the PC mouse buttons can send control sequences to the host that correspond to a combination of the Digital left, middle, and right mouse buttons. The default codes sent by each button are shown in "Graphics Input Modes" in the *Reflection Advanced Topics* manual.

With the DECLBD function, the three mouse button functions can be configured to send codes other than the defaults, and different functions can be sent when the button is pressed and released. Up to six characters can be defined for either a button press or release.

Programming Locator Device Buttons (DECLBD)

$^D C_S < C > \$w < def1 > ; < def2 > ; \dots ; < defn > ^S_T$

The device control string that defines the mouse buttons. This string is valid in Reflection 4 only.

- $< C >$ The clear parameter. 0 clears all button definitions before defining new ones. 1 clears one button at a time.
- $\$w$ The intermediate and final characters that identify the string as DECLBD.
- $< defn >$ The definition for each mouse button. The definition has the format:

$< button > / < down \ code > / < up \ code >$

You include the definitions between the final character (w) and the string terminator (S_T). The $< button >$ is the button on the Digital mouse:

Digital Button	$< button >$
Left	1
Middle	2
Right	3

The $< down \ code >$ and $< up \ code >$ are the codes that the button sends when pressed and released; these are explained below. A forward slash separates the button number, the down code, and the up code, and a semicolon (;) separates each button definition.

In the DECLBD sequence, the $< down \ code >$ and $< up \ code >$ are strings of hex pairs, with each hex pair representing a single ASCII character. Up to six hex pairs (six characters) can be specified for each down code and each up code. (See the ASCII character chart on page 638 for the hex values for each character.)

For example, if you want to clear all button definitions, and define the left mouse button to send the default PF3 key code ($^S_{S3R}$) when pressed, and a carriage return character when released, you would use the following coding:

$^D C_S \emptyset \$w 1 / 8F52 / \emptyset D ^S_T$

The $\emptyset$ following the $^D C_S$ clears all current definitions, and the 1 following the w selects the left button. 8F52 are the hex pairs for $^S_{S3R}$, and the 0D is the hex pair for the carriage return.

Selecting and Mapping Character Sets

Reflection supports the two types of VT terminal character sets:

- ▲ *Hard* character sets, which are built into Reflection
- ▲ *Soft* character sets, which you can create and download to Reflection

Character sets are selected by control functions, and by the **Ctrl-N** and **Ctrl-O** keystrokes.

As an example of loading and using a different character set, do the following:

1. Clear the Online check box in the General Setup dialog box to place Reflection into local mode.
2. Type $\text{Esc} \emptyset$.
3. Press **Ctrl-N**.
4. Type abcd.

Notice the results: the characters on the screen are not the usual display representation for these keys. The escape sequence $\text{Esc} \emptyset$ selects the DEC Special Graphic character set, and the **Ctrl-N** keystroke maps the character set for use (this is explained later in this section).

Now enter **Ctrl-O** and type abcd again. The characters on the screen are the normal characters. The codes stored in display memory and transmitted to the host are the same in both cases; it is only the representation of the code on the screen that is different.

Character Set Support

Characters are divided into the following character sets:

- ▲ ASCII
- ▲ DEC Supplemental Graphic
- ▲ ISO Latin-1 supplemental graphic
- ▲ National replacement sets (12)

- ▲ DEC Special Graphic
- ▲ DEC Technical
- ▲ Dynamically redefinable character set (DRCS)

All of the above character sets—except the dynamically redefinable character set—are *hard* character sets; that is, those built in to Reflection. The DRCS characters are soft characters that can be downloaded.

The DEC Supplemental Graphic and ISO Latin-1 supplemental graphic character sets are composed of symbols and characters for the English language and many Western European languages. For example, the £ symbol and the Å character are in the supplemental character sets.

Together, the ASCII character set and the DEC Supplemental Graphic set constitute the *DEC Multinational* character set. The ASCII character set and the ISO Latin-1 supplemental graphic set constitute the *ISO Latin Alphabet Number 1* character set. The two sets have only a few differences; see the charts on pages 639 and 640.

National replacement character (NRC) sets contain most of the same characters as the ASCII set, plus characters from the supplemental graphic sets used by specific European languages. For example, the Å character is contained in the Finnish, German, and Swedish NRC sets. NRC sets are used primarily in 7-bit operating environments that don't have access to supplemental characters.

The *DEC Special Graphic* and *DEC Technical* character sets contain characters, line-drawing elements, and mathematical symbols; for charts of these sets, see pages 641 and 642.

Character Set Storage

Each character set contains 94 or 96 displayable characters. Reflection can store two character sets at a time, and a given character may appear in more than one set.

To store two character sets at once, Reflection uses two tables, each containing 128 spaces for characters. The first 32 spaces in each table are reserved for the C0 and C1 control characters, such as C_R , L_F , ES_C , and DC_S . The remaining 96 spaces are for the graphical characters—letters, punctuation marks, and other symbols—from the sets listed above; these spaces are called GL (graphic left) and GR (graphic right).

The C0 and GL characters constitute one table, and the C1 and GR characters constitute the other table. Because each table contains no more than 128 characters, an entire table of characters can be encoded in seven data-bits. Any character set can be stored in either the GL or GR table. The combination of a specific GL and GR character set (such as ASCII and DEC Supplemental Graphic) is called the *in-use table*.

When a host application displays a character on the screen, it selects the character by number from the in-use table. The characters in C0 and GL are selected by a 7-bit code, with the high bit of each 8-bit character code set to 0. The characters in C1 and GR are selected by an 8-bit code; the high bit of the 8-bit character code is set to 1.

In 8-bit operating environments, all characters in both tables can be accessed, by either a 7-bit or an 8-bit code. In 7-bit operating environments, however, only characters in C0 and GL can be accessed, since characters from this table are selected by 7-bit codes.

This restriction on 7-bit codes also applies to the VT52 and VT100 emulation modes. Both of these terminals send only 7-bit characters, and cannot send or display characters stored in C1 and GR.

Selecting a Character Set

Character sets are selected and mapped into Reflection's in-use table, defining all the characters Reflection can display. The in-use table is divided into four parts, based on the location of the characters in the character code table.

In-Use Table Part	Character Position in Code Table
C0 control character set	Decimal 0 through 31
GL (graphic left) set	Decimal 32 through 127
C1 control character set	Decimal 128 through 159
GR (graphic right) set	Decimal 160 through 255

The C1 and GR character sets can be accessed only in 8-bit operating environments. They cannot be accessed in VT52 or VT100 modes, for example.

When you start Reflection, these character sets are placed into the in-use table:

- ▲ ASCII in GL
- ▲ DEC Supplemental Graphic in GR

You can have Reflection place the ISO Latin-1 supplemental graphic set into GR by selecting it as the *user-preferred supplemental set* (UPSS). Use the UPS Set list box in the General Setup dialog box to make this selection; see page 233 for more information.

There are two steps to selecting a character set:

1. Designate the Set

Character sets can be designated as G0, G1, G2, or G3. These are *logical* designations. You can designate up to four character sets, and switch among them by selectively mapping them to the in-use table.

2. Map the Set

After designating a character set as G0, G1, G2, or G3, you map it into either GL or GR, which places it in the in-use table. You can then display and send any character from that set.

Designating a Character Set

You designate a character set as G0 through G3 using a select character set (SCS) escape sequence. A 96-character set cannot be designated as G0. The ISO Latin-1 supplemental character set is the only built-in 96-character set.

The following section describes the codes used to select each available character set.

Select Character Set (SCS)

`Esc<Gn><set>`

This sequence designates a character set. The character you enter as <Gn> to specify G0, G1, G2, or G3 depends on whether you are selecting a 94- or 96-character set; see the first table below. You must use a 94-character set SCS sequence to designate a 94-character set, and a 96-character set SCS sequence to designate a 96-character set. The <set> indicates the character set selected; see the second table below.

Character Sets: <Gn> Identifiers

94-Character Set Table	<Gn>	96-Character Set Table	<Gn>
G0	(	G0	(not available)
G1	)	G1	- (hyphen)
G2	*	G2	. (period)
G3	+	G3	/ (forward slash)

The character sets that can be designated as the <set> are specified by a one or two character code, as in the following two tables.

Designate Character Sets

Character Set Name	<set> Specifier
<i>VT200 Mode and Higher:</i>	
ASCII	B
DEC Special Graphic	Ø
DEC Supplemental Graphic	%5
DEC Technical	>
DRCS	<Name of downloaded soft char set>
ISO Latin-1	A
User-preferred supplemental	<

VT100 Mode:

ASCII	B
DEC Technical	1
Special Graphic (line drawing)	Ø
Supplemental Graphic (multinational)	<

For example, in VT320 mode the following sequence designates the ISO Latin-1 supplemental graphic set (a 96-character set) as the G3 logical set:

$E_{SC/A}$

Mapping a Character Set

After designating a character set as G0, G1, G2, or G3, you must map the set into GL or GR of the in-use table. The values in GL and GR are used to translate all incoming codes and how you see them on the display. The GL character set translates codes 32–127 (characters with no high bit set), and the GR character set trans-

lates codes 160–255 (characters with the high bit set). Characters 0–31 and 128–159 are C0 and C1 control codes. *Locking-shifts* and *single-shifts* are used to map character sets.

Locking Shifts

When you use a locking shift, the mapped character set remains in GL or GR until you use another locking shift.

The following locking shift functions are available in all terminal emulation modes:

Locking Shift	Keystroke	Control Code	Function
LS0 (locking shift 0)	Ctrl - O	S _I	Map G0 into GL
LS1 (locking shift 1)	Ctrl - N	S _O	Map G1 into GL

The following locking shift functions are available in VT200 mode and above:

Locking Shift	Control Code	Function
LS1R (locking shift 1, right)	E _{SC} ~	Map G1 into GR
LS2 (locking shift 2)	E _{SC} n	Map G2 into GL
LS2R (locking shift 2, right)	E _{SC} }	Map G2 into GR
LS3 (locking shift 3)	E _{SC} O	Map G3 into GL
LS3R (locking shift 3, right)	E _{SC}	Map G3 into GR

In the following example, the DEC Special Graphic character set is designated as G2, then G2 is mapped into GR using a locking shift:

E_{SC}*Ø

E_{SC}}

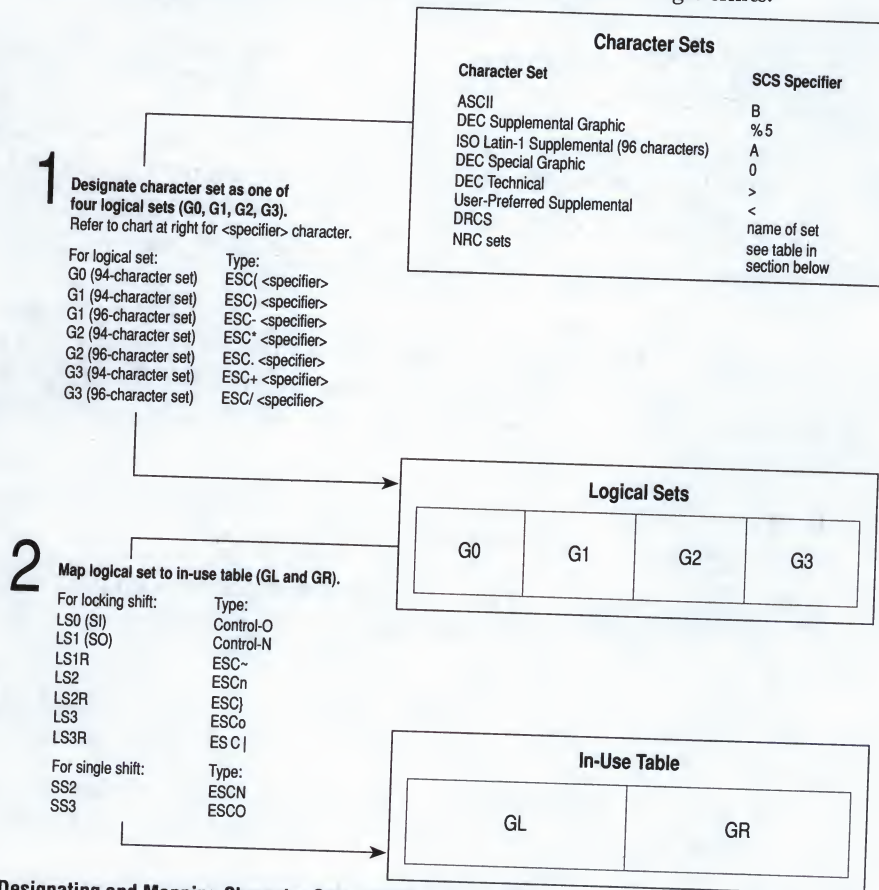
Single Shifts

When you want to display just the next character using a different character set, use a single shift. A single shift maps the character set designated as G2 or G3 into GL for one displayable character. GL then automatically reverts to its previous mapping. Single shifting is like pressing the **Shift** key to generate a different character for a single keystroke, then releasing **Shift**.

Reflection has two single-shift escape sequences available:

Single Shift	8-Bit Character	7-Bit Equivalent	Function
Single shift 2	SS_2	ESC_N	Maps G2 for next character into GL
Single shift 3	SS_3	ESC_O	Maps G3 for next character into GL

The following figure shows how to use locking shifts and single shifts.



Designating and Mapping Character Sets (VT200 series and higher)

National Replacement Character Sets

The national replacement character sets are 94-character sets for use primarily in 7-bit operating environments. Each NRC set replaces some ASCII characters with characters from a specific European language. The NRC sets are useful in environments that cannot access the 8-bit ISO Latin-1 or DEC Supplemental Graphic character sets to generate national characters. The chart on page 652 shows which characters are replaced for each language.

Only one NRC set can be active at a time. To use an NRC set:

1. Select the NRC set you want active from the NRC Set list box in the General Setup dialog box (see page 233).
2. Enable the NRC set by selecting the Use NRC (7-Bit) Chars check box in the General Setup dialog box. This is the same as issuing the DECNRCM control sequence given on page 599.

After these steps, the appropriate character set is automatically designated and mapped into GL.

Once an NRC set is selected and enabled, if the character you want is on your keyboard, just press the key to create it. For example, if you have enabled the French character set and you have a French keyboard, press the  key to create the ç character.

If the national character you want is not on your keyboard, you can use a compose sequence to create it; see page 645 for more information.

If for some reason the host changes the character set stored in GL, and the selected NRC set is no longer mapped there, you can perform the following two steps to remap the NRC set:

1. Designate the character set as G0, G1, G2, or G3, as explained on page 594. You must use one of the 94-character set designators to select an NRC set.
2. Map the designated NRC set into GL, using the mapping codes on page 595. You can map only the set selected in the NRC Set list box in the General Setup dialog box.

In a 7-bit operating environment, you should always map the selected NRC set into GL, since GR is inaccessible in 7-bit modes.

With an 8-bit data path, using an NRC set is optional; when a character set other than *NONE (US)* is selected in the NRC Set list box, you *must* enable the set either by selecting the Use NRC (7 Bit) Chars check box in the General Setup dialog box, or the DECNRCM control sequence.

The following table lists the codes used to designate each NRC set with the SCS function (on page 594). When more than one designator is listed, it's recommended that you use the first one.

Designate NRC Sets

NRC Set Name	<set> Specifier
Dutch	4
Finnish	5 or C
French	R
French Canadian	9 or Q
German	K
Italian	Y
Norwegian/Danish	` or E or 6
Portuguese	%6
Spanish	Z
Swedish	7 or H
Swiss	=
British	A

For example, after *British* is selected in the NRC Set list box, the United Kingdom NRC set is designated as G1, then mapped into GL, using the following:

$E_{SC}A$

Ctrl-N (s_0)

Use National Replacement Characters (DECNRCM)

- $C_{SI}742h$ Reflection uses 7-bit characters from the selected national replacement set.
- $C_{SI}742l$ Reflection uses 7- and 8-bit characters from the DEC Multinational or ISO Latin-1 character sets.

The Reflection setup equivalent is the NRC Set list box in the General Setup dialog box. See page 236.

Soft Character Sets

You can design and download a soft character set, also called a *dynamically redefinable character set* (DRCS), from the host to Reflection. This feature works only in VT200 mode and above. After designing and downloading a soft character set, you designate and map it the same way you designate and map hard character sets. See pages 594 and 595.

Designing a Soft Character Set

Reflection displays each character as a series of dots using pixels, the smallest displayable units on the screen. Each pixel can be either off or on. Each character is confined to a space called the *character cell*. The size of the default character depends on the type of terminal Reflection is emulating.

When designing your own characters, map out character cells on grid paper. Each box on the grid paper can represent one pixel. You can design characters for an 80-column or 132-column font. Reflection truncates characters that are larger than the cell size.

The tables below list the default dimensions for designing soft characters for the VT330/VT340, VT320, VT420, and VT220/240 terminals. Characters can be defined as either *full cell*—occupying the entire character cell—or *text cell*—occupying a smaller space to account for spacing between text characters.

VT330/VT340 Character Dimension	80-Column Font	132-Column Font
Full cell width×height	10×20 pixels	6×20 pixels
Text cell width	9 pixels	5 pixels
VT320 Character Dimension	80-Column Font	132-Column Font
Full cell width×height	15×12 pixels	9×12 pixels
Text cell width	12 pixels	7 pixels
VT420 Character Dimension	80-Column Font	132-Column Font
Full cell width×height (24 rows)	10×16 pixels	6×16 pixels
Text cell width	8 pixels	4 pixels
Full cell width×height (36 rows)	10×10 pixels	6×10 pixels
Full cell width×height (48 rows)	10×8 pixels	6×8 pixels

VT220/VT240 Character Dimension

Full cell width×height

Text cell width

80-Column Font

8×10 pixels

7 pixels

132-Column Font

6×10 pixels

5 pixels

Converting Binary Sixel Values to ASCII Characters

After you've designed a character, you must convert it to a hexadecimal value. Every place in your character where you want a pixel turned on you give a binary value of 1, and every place where you want a pixel turned off you give a binary value of 0.

Reflection receives the code for each soft character as a series of *sixels*. Each sixel is a 6-bit binary code that represents a vertical column of 6 pixels on screen. Each bit in a sixel corresponds to a pixel on the screen.

Follow the steps below to convert a character from a binary grid to its sixel representation to its hexadecimal values:

1. After designing a character, divide the DRCS character cell vertically into groups of 6-pixel-high sixels. The number of groups depends on the cell height. The first group contains the sixels for the top 6-pixel section of the character cell; the second group contains the sixels for the next section of the character cell, and so on. For the VT330 and VT340, there can be as many as four groups of sixels (when loading a 20-pixel-high character, the fourth group contains only two pixels). The least significant bit is at the top, and the most significant bit is at the bottom. Reflection receives the sixel columns in order (from 1 to the maximum character cell width).
2. Convert the binary value of each sixel to its hexadecimal value. Sixel codes must be in the range ? (hex 3F) to ~ (hex 7E), so you must add an offset of hex 3F to the hexadecimal value of each sixel. For example, the binary value 000001 has a hex value of 01. Add hex 3F and the result is hex 40.
3. Convert the hexadecimal value to its ASCII character equivalent. You can find the ASCII equivalents for hex values in the chart on page 638. For example, the character equivalent of hex 40 is @.

The complete conversion of a binary character pattern to its ASCII character equivalent results in a string of up to 40 ASCII characters for the VT330 and VT340 terminals—up to 10 characters for each of the four sections of the character cell.

Once you have made the binary conversion to ASCII characters, you can download your DRCS characters to Reflection, using the DECDLD device control string described next.

Downloading a Soft Character Set (DECDLD)

`DcsPfn;Pcn;Pe;Pcmw;Pw;Pt;Pcmh;Pcss{ Dscs UUUUUUUU/LLLLLLLLL;...}^T`

The device control string that loads a soft character set.

You can load only one soft character set at a time, but you can load two renditions of the same set: an 80-column rendition and a 132-column rendition. In fact, you *should* load both column settings of your soft character set, so that Reflection can select the appropriate rendition based on the column width of the display and the number of display rows.

Pfn	Font buffer to load. There is only one DRCS buffer and valid values 0 and 1, which both refer to the same buffer.
Pcn	Position in the ASCII table in which to load the first soft character. For a 94-character set, a value of 0 or 1 loads the first soft character as decimal 33 of the table. For a 96-character set, a value of 0 loads the first soft character as decimal 32 of the table. The VT200 terminals allow only a 94-character set, and the valid range for this parameter is 1–94. For the VT320 and VT340, the valid range is 0–95.
Pe	Erase control. If an 80-column font is specified (<i>Pw</i> is 0 or 1), a <i>Pe</i> value of 0 or 2 erases the entire character set (all widths and renditions). If a 132-column font is specified (<i>Pw</i> is 2), a <i>Pe</i> value of 0 or 2 erases the 132-column font only. A <i>Pe</i> value of 1 erases only characters being replaced.
Pcmw	Character matrix width. If this parameter is omitted, Reflection uses the default width for the current terminal type.
0	default width for 80/132 columns (see tables on page 600)
1	invalid
2	5×10 pixel cell
3	6×10 pixel cell
4	7×10 pixel cell
5–10	specifies width in pixels

Values 2, 3, and 4 are VT200 compatible, automatically setting the height of the cell to 10 pixels.

P Font width (columns per line). The values $\emptyset$ (the default) and 1 select 80 columns per line; 2 selects 132 columns.

Pt Text or full-cell font. With a text font, Reflection left-justifies the character within the cell, and leaves the rightmost columns blank. A full-cell font can fill the entire cell with pixels. 0 (the default) and 1 define a text font. 2 defines the font as full-cell.

Pcmh Character matrix height. This selects the maximum height of the cell. If this parameter is omitted or 0, the default height is used. The default for the VT320 is 12 pixels high; the default for the VT330 and VT340 is 20 pixels high. Values from 1 to 12 (VT320), 1 to 16 (VT420), or 1 to 20 (VT340) select a character cell with that height. This parameter is ignored if *Pcmw* is 2, 3, or 4.

Pcss Character set size:

0	94-character set	12	36 rows, 132 columns
1	96-character set	21	48 rows, 80 columns
2	24 rows, 132 columns	22	48 rows, 132 columns
11	36 rows, 80 columns		

This also affects the *Pcn* starting position parameter. Not valid for the VT200 series.

{ The final character of the string, marking the end of the parameter list and indicating that the string is a DECDLD function.

Dscs Soft character set name. This is name you use in the SCS escape sequence (see page 594) to select the set. The format is *IF*, where *I* can be $\emptyset$, 1, or 2 intermediate characters from the range decimal 32 to 47 in the ASCII chart, and *F* is a final character in the range decimal 48 to 126. For example, **\$R* could define a soft character set that is currently unused. The value of *Pcss* determines whether the set contains 94 or 96 characters. The recommended default for a soft character set name is *<SP>@*.

UUUUUUU/LLLLLLL

The ASCII characters that represent the sixel patterns defining each character. Sixel bit patterns are separated with a semicolon. Your character set can have 1 to 94 or 1 to 96 patterns, depending on the character set size (the *Pcss* parameter). *U...U* represents the sixels for the top half of the soft character. The forward slash (/) advances the sixel pattern to the bottom half of the character, and *L...L* represents the sixels in the bottom half.

After loading your soft character set, you designate the set as G0, G1, G2, or G3. You can then map it into GL or GR of the in-use table.

Clearing a Soft Character Set (DECDLD)

$D_{CS1};1;2\{<SP>@^{ST}$

The DECDLD control string that clears a soft character set loaded into Reflection.

Any of the following actions also clears a soft character set:

- ▲ Quitting Reflection, then restarting.
- ▲ Resetting to initial state (RIS) with E_{SCC} (see page 626).
- ▲ Performing a soft reset ($\boxed{Ctrl}-\boxed{F2}$), by default; see page 61).

User-Preferred Supplemental Character Set

You can assign the DEC Supplemental Graphic or ISO Latin-1 supplemental character set as the user-preferred supplemental set (UPSS). This is the supplemental set loaded by default when you start Reflection (see page 593).

Assigning a User-Preferred Supplemental Set (DECAUPSS)

$D_{CS0}!u\%5^{ST}$

Assign the DEC Supplemental Graphic set as the UPSS.

$D_{CS1}!uA^{ST}$

Assign the ISO Latin-1 supplemental set as the UPSS.

The Reflection setup equivalent is the UPS Set list box in the General Setup dialog box. See page 233.

Requesting the User-Preferred Supplemental Set (DECRQUPSS)

$cs_{I\&u}$

The control string that the host can use to determine the current user-preferred supplemental character set. Reflection's response to this request is the DECAUPSS sequence above.

Requests and Reports

The host can request many types of information from Reflection, and depending on the response, can adapt the computing environment to match Reflection's capabilities. Reflection can provide the following kinds of information:

- ▲ Type of terminal (identification)
- ▲ Cursor state
- ▲ Operating status
- ▲ Operating level

In general, the host can request information about all the options you or a host can set in Reflection.

Device Attributes

When the host sends a device attributes (DA) request, Reflection provides the following information:

- ▲ Conformance level (1, 2, 3, or 4) and extensions
- ▲ Basic features
- ▲ Identification code

The host can use the information it receives to make the best use of Reflection's features. It also allows the host to determine the cause of certain communication errors.

There are two types of DA exchanges between the host and Reflection: primary DA and secondary DA.

Primary DA Request (DA)

CS_{IC} or CS_{I0C}

With either of these two control functions, the host can request Reflection's service code, conformance level, and basic attributes.*

Reflection replies according to the value of the Terminal ID list box in the General Setup dialog box (see page 229).

The reply can be one of the following:

Primary DA Responses

Terminal	DA response	Reflection reply
VT100 terminal	VT100	$ES_C[?1;0c$
VT100 terminal with advanced video	VT100av.	$ES_C[?1;2c$
VT100 terminal with printer	VT100p	$ES_C[?1;11c$
VT102 terminal	VT102	$ES_C[?6c$
VT125 terminal normal	VT125	$ES_C[?12;7;1;102c$
VT220 terminal normal	VT220	$CS_I?62;1;2;6;7;8;9c$
VT240 terminal normal	VT240	$CS_I?62;1;2;3;4;6;7;8;9c$
VT320 terminal normal	VT320	$CS_I?63;1;2;6;7;8;9c$
VT340 terminal normal	VT340	$CS_I?63;1;2;3;4;6;7;8;9;13;15;16;18;19c$
VT420 terminal normal	VT420	$CS_I?64;1;2;6;7;8;9;15;18;19;21c$
Reflection VT420 (Reflection 2)	WRQ	$CS_I?64;1;2;6;7;8;9;11;14;15;17;18c$
Reflection VT340 (Reflection 4)	WRQ	$CS_I?64;1;2;3;4;6;7;8;9;11;14;15;16;17;18c$

* ES_CZ (DECID) is also a valid request, but its use is only recommended on a VT52 terminal.

The meaning of the numbers in the "Reply" column indicate which features are supported:

Number	Meaning
62	VT200 series terminal
63	VT300 series terminal
64	VT400 series terminal
1	132 columns
2	Printer port
3	ReGIS display
4	Sixel graphics
6	Selective erase
7	Soft character set (DRCS)
8	User-defined keys (UDKs)
9	National replacement character sets
11	Status line
13	Local editing mode
14	8-bit interface
15	DEC technical character set
16	Locator device port
17	Terminal state reports
18	Windowing capability
19	Dual sessions
21	Horizontal scrolling

Datacomm Settings Request

c_{SI0x} Both of these functions request a report of Reflection's parity
 c_{SI1x} and baud rate settings.

Reflection responds with one of the following:

- ▲ Reflection response for a Level 2 terminal.

$c_{SI2}; <n1>; <n2>; <receive\ baud\ rate>; <transmit\ baud\ rate>; 1; 0x$

- ▲ Reflection response for a Level 3 terminal.

$c_{SI3}; <n1>; <n2>; <receive\ baud\ rate>; <transmit\ baud\ rate>; 1; 0x$

Note: Both of the response strings do the same thing: what differentiates them is the beginning number in the response (2 for C_{SI0x} and 3 for C_{SI1x}) ▲

The values for $\langle n1 \rangle$ and $\langle n2 \rangle$ in the responses are based on the value selected in the Parity list box in the Datacomm Setup dialog box:

Data-bits/parity	$\langle n1 \rangle$	$\langle n2 \rangle$
8/NONE (default)	1	1
8/EVEN	5	1
8/ODD	4	1
7/NONE	1	0
7/EVEN	5	0
7/ODD	4	0
7/MARK ("ones" parity)	3	0
7/SPACE ("zeros" parity)	2	0

The values for $\langle \text{receive baud rate} \rangle$ and $\langle \text{transmit baud rate} \rangle$ are based on the value selected in the Baud Rate list box in the Datacomm Setup dialog box:

Baud	$\langle \text{Value} \rangle$	Baud	$\langle \text{Value} \rangle$	Baud	$\langle \text{Value} \rangle$
110	16	1800	72	9600	112
150	32	2400	88	19200	120
300	48	3600	96	38400	128
600	56	4800	104	57600	136
1200	64	7200	108	115200	144

For example, when the host requests terminal parameters with C_{SI1x} , Reflection might respond with:

$C_{SI3};1;1;120;120;1;0x$

This means that Reflection is configured as a Level 3 terminal, and parity is set to 8 bits, no parity. The receive and transmit baud rates are both 19200.

Secondary DA Request (DA)

- $c_{SI} > c$ With either of these two control functions, the host can request Reflection's identification code and hardware options (the *secondary device attributes*). Reflection responds with the sequence described next.
- $c_{SI} > \emptyset c$
- $c_{SI} 24; 11; \emptyset c$ Reflection's response to the above DA request. The code 24 identifies Reflection as a VT320 terminal. The 11 indicates a firmware version, and the $\emptyset$ indicates that there are no hardware options.

Device Status Reports (DSR)

The host can send a DSR request to Reflection for information on the following:

- ▲ Operating status
- ▲ Cursor position
- ▲ Printer port
- ▲ User-defined keys
- ▲ Keyboard dialect

There are different DSR requests for different features. DSR requests and reports follow either ANSI standard or DEC private format.

Operating Status (DSR)

- $c_{SI} 5n$ Host request for Reflection's operating status. Reflection always responds with $c_{SI} \emptyset n$, indicating no malfunctions.

Cursor Position Report (CPR)

- $c_{SI} 6n$ Host request for a cursor position report. Reflection responds with the sequence described next.
- $c_{SI} <row>; <column> R$ Reflection's response to the above CPR sequence. The $<row>$ and $<column>$ indicate the current row and column of the cursor.

Extended Cursor Position Report (DECXCPR)

$C_{SI?6n}$ VT400 series host request for a cursor position report. Reflection responds with the sequence described next.

$C_{SI<row>;<column>;<page>R}$

Reflection's response to the above DECXCPR sequence, indicating the cursor's $<row>$, $<column>$, and $<page>$.

Printer Status (DSR)

$C_{SI?15n}$ Host request for the current printer status. Reflection responds with one of the sequences described next.

$C_{SI?13n}$ Reflection response to the above request, indicating that the host cannot print to a PC printer. The data set ready (DSR) signal has not been asserted on the printer port since the last power-up or reset. There may be no printer locally connected to the PC printer port.

$C_{SI?10n}$ Reflection response to the above request, indicating that the host can print to a PC printer and the printer is ready. DSR is asserted on the printer port.

UDK Status (DSR)

$C_{SI?25n}$ Host request for the UDK status: locked or unlocked. This request is valid only for the VT200 or higher series terminals. Reflection responds with one of the sequences described next.

$C_{SI?20n}$ Reflection response to the above request, indicating that the UDKs are unlocked.

$C_{SI?21n}$ Reflection response to the above request, indicating that the UDKs are locked.

Keyboard Dialect (DSR)

$c_{SI?26n}$ Host request for keyboard dialect. Reflection responds with the sequence described next.

$c_{SI?27;<n1>;<n2>;<n3>n}$

Reflection response to the above request.

The possible values for $<n1>$ are:

$<n1>$	Keyboard	$<n1>$	Keyboard
1	North American	11	Swiss
2	British	12	Swedish
4	French Canadian	13	Norwegian/Danish
6	Finnish	14	French
7	German	15	Spanish
8	Dutch	16	Portuguese
9	Italian		

$<n2>$ is the keyboard status: 0 means the keyboard is ready, and 3 indicates there is no keyboard. Reflection always returns 0.

$<n3>$ is the keyboard type. 1 indicates an LK401 and is the only value Reflection will give for $<n3>$.

Terminal State Reports

With the request terminal state report sequence (DECRTSR), the host can request information about Reflection's current operating state. Reflection responds with a terminal state report (DECTSR) device control string that includes all of Reflection's features except UDK definitions and the soft character set. The host can save the reported information, so that if an application makes temporary changes to the state, the original state can be restored.

Request Terminal State Report (DECRTSR)

$c_{SI1\$u}$

Host request for a terminal state report (DECTSR).

Terminal State Report Response (DECTSR)

$D_{CS1} \$ \$ D \dots D <checksum\ 1> <checksum\ 2>^S_T$

The sequence Reflection sends in response to DECRQTSR (above). DECTSR provides the host with a complete report on Reflection's current operating state, except UDKs and the soft character set. $D \dots D$ is the data string indicating the status of various features. $<checksum\ 1> <checksum\ 2>$ is a two-byte checksum of all the data in the report.

Restore Terminal State (DECRSTS)

$D_{CS1} \$ p D \dots D^S_T$

Restore Reflection's operating state to the state stored with DECTSR. $D \dots D$ indicates the same data string saved with DECTSR.

Note: The format of the data string used by DECTSR and DECRSTS may change between software versions and is not intended to be parsed or used by host applications. The data received from DECTSR should be returned unmodified by DECRSTS. ▲

Presentation State Reports

With the DECRQPSR function, the host can request information about Reflection's presentation state, such as the current cursor position, character sets, and tab stops. Depending on the type of request, Reflection responds with one of two presentation state reports:

▲ Cursor Information Report

Reports on the cursor position, including its visual attributes and character protection attributes. The origin mode (DECOM) and the currently loaded character sets are also reported.

▲ Tab Stop Report

Reports the current tab stop settings. The host can save the reported information, using it to later restore Reflection to its original state if an application temporarily changes the state.

Presentation State Report Request (DECRQPSR)

$^{CS_I} \langle n \rangle \w Host request for a presentation state report.

$\langle n \rangle$	Report Requested
1	Cursor information report
2	Tab stop report

Cursor Information Report (DECCIR)

$^{D_{CS1}} \$uD \dots D^{S_T}$ Reflection response to the DECRQPSR sequence $^{CS_{I1}} \$w$.

The cursor information report provides the status of the following:

- ▲ Cursor position
- ▲ Visual attributes
- ▲ Character protection attribute
- ▲ Origin mode (DECOM)
- ▲ Active character sets

$D \dots D$ is the data string. Its format is:

$Pr; Pc; Pp; Srend; Satt; Sflag; Pgl; Pgr; Scss; Sdesig$

- Pr The number of the line containing the cursor.
- Pc The number of the column containing the cursor.
- Pp The number of the current page; for the VT320 this is always 1.
- $Srend$ One or more ASCII characters indicating the visual attributes (such as bold and underline) currently in use for writing (see page 546).

To find out which attributes are set, you need to convert the character to an 8-bit binary number. See the display control character set charts starting on page 636 for the decimal value of the character.

After converting a character to its binary number, use the following table to determine the meaning of $Srend$. Bit 8 is the most significant bit and bit 1 is the least significant.

Bit	Attribute	Bit Value
8	—	Always $\emptyset$ (off)
7	—	Always 1 (on)
6	Extension indicator	$\emptyset$ = No more attribute data 1 = Another character of visual attribute data follows this one
5	—	Always $\emptyset$ (off)
4	Reverse video	$\emptyset$ = Off 1 = On
3	Blinking	$\emptyset$ = Off 1 = On
2	Underline	$\emptyset$ = Off 1 = On
1	Bold	$\emptyset$ = Off 1 = On

For example, suppose the *Srend* character reported is an ASCII uppercase L. The binary equivalent of L (ASCII decimal 76) is 01001100. The 7th bit is always on (1), and with the 4th and 3rd bits also on, this means that the inverse video and blinking attributes are set.

Satt One or more characters that indicate any selective erase attributes currently set for writing (see the information starting on page 572). The same conversion method is used as explained above for the *Srend* parameter. The following table explains the meaning of the 8-bit binary number.

Bit	Attribute	Bit Value
8	—	Always $\emptyset$ (off)
7	—	Always 1 (on)
6	Extension indicator	0 = No more protection data 1 = Another character of selective erase data follows this one
5	—	$\emptyset$ = Reserved for future use
4	—	$\emptyset$ = Reserved for future use
3	—	$\emptyset$ = Reserved for future use

2	—	∅ = Reserved for future use
1	Selective erase (DECSCA)	∅ = Off 1 = On

For example, if the *Satt* character reported is an ASCII uppercase A, selective erase is set for writing. The letter A has a decimal value of 65, giving a binary equivalent of 01000001. The 7th bit is always 1, and the 1st bit set to 1 means that selective erase is on.

sflag One or more characters that indicate several flags and modes Reflection must save. Again, to decode the character, you must convert it to an 8-bit binary number as explained above. The following table explains the meaning of the 8-bit binary number.

Bit	Attribute	Bit Value
8	—	Always ∅ (off)
7	—	Always 1 (on)
6	Extension indicator	∅ = No more flag data 1 = Another character of flag data follows this one
5	—	∅ = Reserved for future use
4	Autowrap	∅ = Autowrap not pending 1 = Autowrap pending
3	Single shift 3 (SS_3) setting	∅ = SS_3 is off 1 = G3 mapped into GL only for next typed character
2	Single shift 2 (SS_2) setting	∅ = SS_2 is off 1 = G2 mapped into GL only for next typed character
1	Origin mode	∅ = Origin mode reset 1 = Origin mode set

For example, if the *Sflag* character reported is an ASCII uppercase J, autowrap is pending, and a single shift 2 has been received. The letter J has a decimal value of 74 and a binary value of 01001010. The 7th bit is always 1, and the 4th and 2nd bits set to one correspond to the autowrap pending and single shift 2 flags.

Pgl The number of the logical character set mapped into GL:

Code	Meaning
Ø	G0 is in GL
1	G1 is in GL
2	G2 is in GL
3	G3 is in GL

Pgr The number of the logical character set mapped into GR:

Code	Meaning
Ø	G0 is in GR
1	G1 is in GR
2	G2 is in GR
3	G3 is in GR

Scss A character that indicates the size of the character sets in G0 through G3. Convert the character to an 8-bit binary number, and refer to the table below:

Bit	Attribute	Bit Value
8	—	Always Ø (off)
7	—	Always 1 (on)
6	Extension indicator	Ø = No more size data 1 = Another character of character size data follows this one
5	—	Ø = Reserved for future use
4	G3 set size	Ø = 94 characters 1 = 96 characters
3	G2 set size	Ø = 94 characters 1 = 96 characters
2	G1 set size	Ø = 94 characters 1 = 96 characters
1	G0 set size	Ø = 94 characters 1 = 96 characters

For example, if ASCII is designated as G0 and G1, and ISO Latin-1 supplemental graphic is designated as G2, then Scss is the ASCII uppercase D

character. The letter D has a decimal value of 68, and a binary value of 01000100. The 7th bit is always on (1). The 4th, 2nd, and 1st bits are off ($\emptyset$), meaning the character sets in G3, G1, and G0 have 94 characters. The 3rd bit is on, meaning the character set in G2 (ISO Latin-1) has 96 characters.

Sdesig A string of intermediate and final characters that indicate the character sets designated as G0 through G3. The final characters are the same as those used in the SCS sequences (see page 594).

For example, if ASCII is designated as G0 and G1, and DEC Supplemental Graphics is designated as G1 and G2, the *Sdesig* string would be reported as BB%5%5.

For example, a cursor information report might look like this:

$^{D_{CS1}}\$u1;1;1;@;@;@;\emptyset;2;@;BB\%5\emptyset^{S_T}$

1;1;1; Means that the cursor is at row 1, column 1, on the first page.

@;@;@; Means that no individual character attributes or selective erase attributes are set for writing, DECCOM is reset, and that there is no S_{S2} , S_{S3} , or autowrap pending.

$\emptyset;2;$ Means that G0 is mapped into GL, and G2 is in GR.

@; Means all character sets have 94 characters.

BB%5 $\emptyset$ Means that ASCII is in G0 and G1, DEC Supplemental Graphic is in G2, and DEC Special Graphic is in G3.

Tab Stop Report (DECTABSR)

$^{D_{CS2}}\$uD...D^{S_T}$

Reflection response to the DECRQPSR sequence $^{C_{SI2}}\$w$. This reports Reflection's current tab settings to the host. D...D is a data string indicating the column number location of each tab stop. Tab stops are separated by a forward slash (/).

For example, a tab stop report might look like this:

$^{D_{CS2}}\$u1\emptyset/15/23/31^{S_T}$

10, 15, 23, and 31 are the column numbers for the tab stops.

Restore Presentation State (DECRSPS)

$D_{CS<n>}tD \dots D^S_T$

The host can send this sequence to restore Reflection to a previous state based on one of the two presentation state reports: DECCIR and DECTABSR.

<n> Presentation State Restored

- 0 An error occurred
- 1 Restore the cursor state from DECCIR
- 2 Restore the tab state from DECTABSR

DECRSPS restores the information from only one report at a time, with the format of the data string $D \dots D$ exactly the same as it was received.

Mode Settings

The host can request the current settings of any ANSI or DEC private modes, using the DECRQM control string. In response, Reflection sends a DECRPM string, reporting which modes are currently set and reset.

The host can use the information in the report to save the current mode settings, and later restore Reflection's mode settings to their saved state (with an SM or RM sequence).

Mode Settings Request (DECRQM)

$C_{SI<n>}Sp$

Host request for ANSI mode settings, where <n> is an ANSI mode from the following table:

ANSI Modes: DECRQM, DECRPM, SM, RM

Mode	Mnemonic	<n>
Keyboard action	KAM	2
Control representation	CRM	3
Insert/replace	IRM	4
Horizontal editing	HEM*	10
Send/receive	SRM	12
Linefeed/new line	LNM	20

* This control function cannot be set with the SM function (page 620).

$cs_I?<n>\$p$

Host request for DEC private mode setting, where $<n>$ is a private mode from the following table:

DEC Private Modes: DECQRM, DECRPM, SM, RM

Mode	Mnemonic	$<n>$
Cursor keys	DECCKM	1
ANSI	DECANM	2
Column	DECCOLM	3
Scrolling	DECSCLM	4
Screen	DESCSNM	5
Origin	DECOM	6
Autowrap	DECAWM	7
Autorepeat	DECARM	8
Print form feed	DECPFF	18
Print extent	DECPEX	19
Text cursor enable	DECTCEM	25
NRC set	DECNRCM	42
Numeric keypad	DECNKM	66
Backarrow key	DECBKM	67
Keyboard usage	DECKBUM	68

Report Mode (DECRPM)

Reflection response to a request mode (DECQRM) function. This tells the host whether a certain mode is set or reset. As with the DECQRM function, there are two versions of DECRPM: one for reporting ANSI mode settings, and one for reporting DEC private mode settings.

$cs_I<n1>;<n2>\$y$

Reflection response to an ANSI mode request. $<n1>$ is the mode from the ANSI mode table on the previous page. $<n2>$ is one of the following mode states:

0	Unknown
1	Set
2	Reset
3	Permanently set
4	Permanently reset

$c_{SI}?\langle n1 \rangle; \langle n2 \rangle \y Reflection response to a DEC private mode request. $\langle n1 \rangle$ is the mode from the DEC private mode table on the previous page. $\langle n2 \rangle$ is the mode state; these are the same as for the ANSI mode states listed above.

Restoring Mode Settings

ANSI and DEC private modes are control functions that have only two settings: *set* and *reset*. Resetting Reflection affects many control functions, including some ANSI and DEC private modes. Separate set mode (SM) sequences set ANSI and DEC private modes, and separate reset mode (RM) sequences reset ANSI and DEC private modes. You cannot set and reset both ANSI and DEC private modes with the same SM or RM function.

Set Mode (SM)

$c_{SI}\langle n \rangle; \dots \langle n \rangle h$ Set one or more ANSI modes, where $\langle n \rangle$ is a mode from the ANSI table on page 618.

$c_{SI}?\langle n \rangle; \dots \langle n \rangle h$ Set one or more DEC private modes, where $\langle n \rangle$ is a mode from DEC private table on page 619.

Reset Mode (RM)

$c_{SI}\langle n \rangle; \dots \langle n \rangle l$ Reset one or more ANSI modes, where $\langle n \rangle$ is a mode from the ANSI table on page 618.

$c_{SI}?\langle n \rangle; \dots \langle n \rangle l$ Reset one or more DEC private modes, where $\langle n \rangle$ is a mode from the DEC private table on page 619.

Control Function Settings

With the DECRQSS function, the host can request from Reflection a variety of control function settings. The host can save the information reported, so that if an application makes temporary changes to any settings, it can later restore Reflection to its previous state.

Requests can be made for the following control function settings:

Control Functions for DECRQSS Requests

Control Function	Mnemonic	Intermediate and Final Character(s)
Select active display	DECSASD	\$}
Select attribute change extent	DECSACE	*x
Select columns per page	DECS CPP	\$
Select graphic rendition	SGR	m
Select number of lines/screen	DECSNLS	*
Set character attribute	DECS CA	"q
Set conformance level	DECSCL	"p
Set left and right margins	DECSLRM	s
Set page memory arrangement	DECSLPP	t
Set status line type	DECSSDT	\$~
Set top and bottom margins	DECSTBM	r

Control Function Settings Request (DECRQSS)

$^{D_C}S\$qD\dots D^{S_T}$ Host request for a selection or setting. $D\dots D$ is the intermediate and final characters of the function. Information for only one function can be requested at once.

For example, the following DECRQSS sequence asks about the DECSCL (select conformance level) function:

$^{D_C}S\$q"p^{S_T}$

The " is the intermediate character, and p is the final character.

Control Function Settings Response (DECRPSS)

$^{D_C}S<n>\$rD\dots D^{S_T}$ Reflection sends this sequence to the host in response to a DECRQSS sequence. If the value of $<n>$ is 0, then the host request is invalid. If $<n>$ is 1, the request is valid. The string $D\dots D$ contains the current settings of valid control functions, and consists of all characters in the control function except $^{C_{S_I}}$ or $^{E_{S_C}}$.

For example, if the host requests Reflection's conformance level (DECSCSL; page 543) as in the DECRQSS example above, the default settings for Reflection 2 result in the following DECRPSS response:

$D_{CS1\$r63;2^*p^S_T}$

If the host requests a setting that Reflection does not recognize, Reflection responds with the following:

$D_{CS0\$r^S_T}$

Reflection does not send a data string back to the host when it receives an invalid request (indicated by $\emptyset$).

Locator Device Port (DSR)

$C_{SI?55n}$	Request from the host for the status of the locator device.
$C_{SI?56n}$	Request from the host to identify the type of locator device.
$C_{SI?53n}$	Reflection's response to $C_{SI?55n}$, indicating that no locator device is detected.
$C_{SI?50n}$	Reflection's response to $C_{SI?55n}$, indicating that a locator device is detected.
$C_{SI?57;\emptyset n}$	Reflection's response to $C_{SI?56n}$, indicating there is no locator device connected, or the device is not a mouse or tablet.
$C_{SI?57;1n}$	Reflection's response to $C_{SI?56n}$, indicating that the locator device is a mouse.

Request Color Table—VT340 Only (DECRQTSR)

$C_{SI2\$u}$ Request color table report (VT340 only). If Reflection is configured as a VT340 terminal, it responds with the DECCTR sequence below. Otherwise, it responds with $D_{CS0\$s^S_T}$.

The host can save the color table information, so that if an application changes the table, the saved information can be used to restore Reflection to its original state.

Report Color Table (DECCTR)

$D_{CS}2\$s<data>^S_T$ Report the values of the current color table (VT340 only).

If the color coordinate system is HLS, the format of the *<data>* string is as follows:

```
<color 0>;1;H;L;S/<color 1>;1;H;L;S/.../<color 15>;1;H;L;S
```

If the color coordinate system is RGB, the format of the *<data>* string is as follows:

```
<color 0>;2;R;G;B/<color 1>;2;R;G;B/.../<color 15>;2;R;G;B
```

Restore Color Table (DECRSTS)

$D_{CS}2\$p<data>^S_T$ Restore the color table.

For the VT330, applications cannot use DECRSTS to restore a color table; the VT330 ignores any attempt to restore a color table. The format of the *<data>* string is identical to the format given above for the DECCTR function.

This control string is similar in format to the DECRSTS function that restores the terminal state (page 612). If the host has saved the color table information reported by the DECCTR function above, it can use this function to restore the table to its previous state.

Saving and Restoring the Cursor State (VT Mode)

With the DECSC function, a variety of Reflection's cursor state settings can be saved. The DECRC function restores the saved state. An application can use these functions to save the cursor state, make temporary changes, and later restore the state to its original settings. A separate cursor state is saved for the status line and the main display, whichever is active. Reflection, not the host, saves the cursor state information.

Save Cursor State (DECSC)

E_{SC7}

Save the following cursor state settings in Reflection's memory:

- ▲ Cursor position
- ▲ Character attributes set by SGR
- ▲ Character sets in GL and GR
- ▲ Whether autowrap is set
- ▲ State of origin mode (DECOM)
- ▲ Selective erase attributes
- ▲ Any S_2 or S_3 functions sent

Restore Cursor State (DECRC)

E_{SC8}

Restore the cursor state saved with DECSC. If no previous DECSC was performed, DECRC does the following:

- ▲ Homes the cursor
- ▲ Resets origin mode (DECOM)
- ▲ Turns off all character attributes
- ▲ Maps the ASCII character set into GL, and the DEC Supplemental Graphic set into GR

Saving and Restoring the Cursor State (ANSI Mode)

When the Mode list box in the General Setup dialog box is set to either SCO ANSI or BBS ANSI, the cursor state can be saved and restored with the sequences described here.

C_{SIS}

Save cursor state.

C_{SIU}

Restore cursor state.

User-Preferred Supplemental Set Request (DECRQUPSS)

With the DECRQUPSS, the host can determine which of the two user-preferred supplemental character sets is active: ISO Latin-1 or DEC Supplemental Graphic. Reflection responds with the DECAUPSS sequence (page 604).

- | | |
|----------------------|---|
| $^{CS_{I\&u}}$ | Request user-preferred supplemental character set. Reflection can respond with one of the sequences described next. |
| $^{DC_{S0!u\&5S_T}}$ | Reflection response to the above request, indicating that the UPSS is DEC Supplemental Graphic. |
| $^{DC_{S1!uA^S_T}}$ | Reflection response to the above request, indicating that the UPSS is ISO Latin-1 supplemental graphic. |

Window Request and Report

The host application uses this VT400 control function to find out how much of the current page is displayed in terms of rows and columns.

Request Displayed Extent (DECRQDE)

- | | |
|-------------|--|
| $^{CS_I"v}$ | The host sends this control function to find out how much of the current page is displayed on the screen. Reflection responds with the DECRPDE sequence. |
|-------------|--|

Report Displayed Extent (DECRPDE)

$^{CS_I<n1>;<n2>;<n3>;<n4>;<n5>;"w}$

Response to DECRQDE. Indicates how much of the current page is displayed on the screen. The parameters are:

- | | |
|--------|--|
| $<n1>$ | Number of lines on the current page that are displayed, excluding the status line. |
| $<n2>$ | Number of columns on the current page displayed. |
| $<n3>$ | Column number of the leftmost column displayed. |
| $<n4>$ | Line number of the top line displayed. |
| $<n5>$ | Page number in page memory. |

Resetting and Testing

There are four control functions you can use to reset Reflection:

- ▲ Reset to initial state—hard terminal reset (RIS)
- ▲ Secure terminal reset (DECSR)
- ▲ Soft terminal reset (DECSTR)
- ▲ Tab clear (TBC)

Reset to Initial State (RIS)

E_{SCC}

Reset Reflection to its last saved setup values (also called a *hard reset*; the default keystroke is **Ctrl-F3**). See page 56 for a list of the values reset.

Because RIS terminates a currently executing command language program, you should not use this escape sequence in the DISPLAY command of a command language program.

Secure Terminal Reset (DECSR)

$C_{SI< n > + p}$

Resets Reflection, using the settings that were last activated. This control function is similar to RIS, but does not do a disconnect. DECSR does a hard reset that does not affect datacomm: it does not clear incoming datacomm or send an XON. The $<n>$ is a random number from 0 to 16383 that is used in the reset confirmation control function (DEC SRC, described on page 627). Cannot be sent in printer controller mode.

DECSR does the following:

- ▲ Clears UDKs
- ▲ Clears soft character sets
- ▲ Clears display and page memory
- ▲ Moves the cursor to the upper-left corner of the first page

- ▲ Resets the scrolling margins
- ▲ Resets origin mode (DECOM) to absolute
- ▲ Sets visual character attributes to normal
- ▲ Sets the selective erase (DECSCA) attribute to not selectively erasable
- ▲ Sets all character sets to the defaults (G0,G1, G2, G3, GL, GR)
- ▲ Erases macro memory
- ▲ Erases the paste buffer—whatever is stored on the “clipboard”
- ▲ Reinitializes the state of the keyboard:
 - Clears the keyboard input buffer
 - Cancels any compose sequence in progress
 - Unlocks the keyboard (resets KAM)

Reset Confirmation (DEC SRC)

$^C S_I \langle n \rangle * q$

Reset confirmation. Returns a report if the $\langle n \rangle$ parameter was included in the latest secure reset (DEC SR). The report indicates that the secure reset was successful. The $\langle n \rangle$ parameter in DEC SRC matches the $\langle n \rangle$ used in DEC SR (a number from 0 to 16383).

Soft Terminal Reset (DEC STR)

$^C S_I ! p$

Resets most of Reflection's default settings. This is available only with VT200 emulation and above. The keystroke equivalent of DEC STR is **Ctrl-F2** by default.

The following table shows the features reset by DECSTR and their mnemonic identifiers:

Feature	Mnemonic	Value After Reset
Autowrap	DECAWM	Cancel autowrap
Cursor keys	DECCKM	Normal
Insert/replace	IRM	Replace
Keyboard action	KAM	Unlocked
Numeric keypad	DECKPNM	Numeric characters
Origin	DECOM	Absolute
Text cursor enable	DECTCEM	Cursor enabled
Character sets	G0-G3, GL, GR	VT320 default settings
Cursor state	DECSC	Home position
Active display	DECSASD	Main display
Select graphic rendition	SGR	Normal rendition
Selective erase	DECSCA	Normal attribute
Top/bottom margins	DECSTBM	1/bottom of display
Use NRC characters	DECNRCM	No*

Tab Clear (TBC)

C_{S13g} Clear all tab stops.

C_{S1g} or C_{S10g} Clear only the tab stop at the current position.

You can set tabs using the Tab Setup dialog box, explained on page 273. You can also set a tab stop at the current column with the escape sequence E_{SCH} . The TBC function only clears tab stops.

Testing Reflection

There are two control functions the host can send to test the terminal: one to invoke a confidence test, and one to perform a screen alignment test. In Reflection, neither has much significance.

* If you have selected the Use NRC (7-Bit) Chars check box in the General Setup dialog box (and the value of in the NRC Set list box is other than NONE), you can preserve its setting with the command SET PRESERVE-NRC YES. See the Reflection *Command Language* manual for more information.

Terminal Self-Test (DECTST)

^{CS}I4y In the case of a serial connection, causes a communications line disconnect, drops DTR for 2 seconds, and then sends a ^{DC}1 regardless of flow control settings.

If you are connected through a network card and a LAN, the control function performs the appropriate LAN disconnect operation. See pages 97 through 116 for information on network connections.

Screen Alignment Pattern (DECALN)

^{ES}C#8 Display a screen full of E's. On a terminal, this pattern can be used to align the screen display.

VT52 Control Functions

The following functions control Reflection in VT52 mode. You can enter VT52 mode by selecting VT52 from the Mode list box in the General Setup dialog box (see page 230), or with the DECANM control function below. In VT52 mode, many ANSI-mode features and functions are ignored.

Enter VT52 Mode (DECANM)

^{CS}I?21 Set VT52 mode as the operating level (only VT52 control functions are recognized).

Exit VT52 Mode (No Mnemonic)

^{ES}C< Exit VT52 mode and enter VT100 mode.

Graphics Mode (No Mnemonic)

^{ES}C^F Enter graphics mode (use DEC Special Graphic character set).

^{ES}C^G Exit graphics mode (use ASCII character set).

Cursor Positioning (No Mnemonic)

ES_{cA}	Move the cursor up.
ES_{cB}	Move the cursor down.
ES_{cC}	Move the cursor forward.
ES_{cD}	Move the cursor backward.
ES_{cH}	Move the cursor to the top of the display.
$ES_{cY<R><C>}$	Move the cursor to row $<r>$ and column $<c>$, where $<r>$ and $<c>$ are single ASCII characters whose decimal value is the desired row or column plus 31. For example, $ES_{cY\&+}$ would indicate row 7, column 12. Row $7 + 31 = 38$, which is represented by the ASCII character. Column $12 + 31 = 43$, which is represented by the ASCII + character.

Erasing (No Mnemonic)

ES_{cK}	Erase from cursor to end of line.
ES_{cJ}	Erase from cursor to end of screen.

Identification Request (No Mnemonic)

ES_{cZ}	Host issued identification request.
$ES_{c/Z}$	Reflection's reply to host identification request, indicating the operating mode is VT52.

Keypad Mode (No Mnemonic)

$ES_{c=}$	Set keypad to application mode.
$ES_{c>}$	Set keypad to normal mode (sends numeric sequences).

Printing Modes (No Mnemonic)

ESC^	Turn on auto print mode.
ESC_	Turn off auto print mode.
ESCW	Start controller mode.
ESCX	Stop controller mode.
ESCv	Print the cursor line.
ESC]	Print the screen.

Reverse Linefeed (No Mnemonic)

ESC I	Reverse linefeed. The cursor moves up one row in the current column.
-------	--

Appendices

The appendices cover the following topics:

- ▲ Character sets supported by Reflection, including control characters, DEC character sets, and the ASCII character set.
- ▲ National keyboards and characters, and how to use the **Compose** key sequence to enter special characters, such as Å.
- ▲ A reference for users of pre-5.0 versions of Reflection that shows the location of setup fields in the new user interface

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Character Sets

The following is included in this appendix:

- ▲ Display control character set (left half) with C0 codes
- ▲ Display control character set (right half) with C1 codes
- ▲ ASCII character set
- ▲ DEC multinational character set
- ▲ ISO Latin-1 supplemental graphic character set
- ▲ DEC special graphic character set
- ▲ DEC technical character set
- ▲ DEC multinational to IBM characters—how MCS characters are translated during disk operations

The chapter “Using Control Functions” starting on page 527 explains how the C0 and C1 control characters are used to form control sequences (introduced by ^CSI), escape sequences (introduced by ^ESC), and device control strings (introduced by ^DCS).

See pages 529 and 532 for definitions of the C0 and C1 display control codes.

Display Control Character Set (Left Half): C0 Codes

Decimal →
Hex →

00 00	N _{UL}	16 10	D _{LE}	32 20	(space)	48 30	0	64 40	@	80 50	P	96 60	,	112 70	p
01 01	S _{OH}	17 11	D _{C1}	33 21	!	49 31	1	65 41	A	81 51	Q	97 61	a	113 71	q
02 02	S _{TX}	18 12	D _{C2}	34 22	"	50 32	2	66 42	B	82 52	R	98 62	b	114 72	r
03 03	E _{TX}	19 13	D _{C3}	35 23	#	51 33	3	67 43	C	83 53	S	99 63	c	115 73	s
04 04	E _{OT}	20 14	D _{C4}	36 24	\$	52 34	4	68 44	D	84 54	T	100 64	d	116 74	t
05 05	E _{NQ}	21 15	N _{AK}	37 25	%	53 35	5	69 45	E	85 55	U	101 65	e	117 75	u
06 06	A _{CK}	22 16	S _{YN}	38 26	&	54 36	6	70 46	F	86 56	V	102 66	f	118 76	v
07 07	B _{EL}	23 17	E _{TB}	39 27	,	55 37	7	71 47	G	87 57	W	103 67	g	119 77	w
08 08	B _S	24 18	C _{AN}	40 28	(	56 38	8	72 48	H	88 58	X	104 68	h	120 78	x
09 09	H _T	25 19	E _M	41 29	)	57 39	9	73 49	I	89 59	Y	105 69	i	121 79	y
10 0A	L _F	26 1A	?	42 2A	*	58 3A	:	74 4A	J	90 5A	Z	106 6A	j	122 7A	z
11 0B	V _T	27 1B	E _{SC}	43 2B	+	59 3B	;	75 4B	K	91 5B	[	107 6B	k	123 7B	{
12 0C	F _F	28 1C	F _S	44 2C	,	60 3C	<	76 4C	L	92 5C	\	108 6C	l	124 7C	
13 0D	C _R	29 1D	G _S	45 2D	-	61 3D	=	77 4D	M	93 5D	]	109 6D	m	125 7D	}
14 0E	S _O	30 1E	R _S	46 2E	.	62 3E	>	78 4E	N	94 5E	^	110 6E	n	126 7E	~
15 0F	S _I	31 1F	U _S	47 2F	/	63 3F	?	79 4F	O	95 5F	_	111 6F	o	127 7F	Δ

C0 CODES

GL CODES
(ASCII GRAPHIC)

Display Controls (Left Half) with C0 Codes

Display Control Character Set (Right Half): C1 Codes

Decimal → Hex →	128 80	80	144 90	D _{CS}	160 A0	N _{SP}	176 B0	°	192 C0	À	208 D0	Ð	224 E0	à	240 F0	ð
	129 81	81	145 91	P _{U1}	161 A1	¡	177 B1	±	193 C1	Á	209 D1	Ñ	225 E1	á	241 F1	ñ
	130 82	82	146 92	P _{U2}	162 A2	¢	178 B2	²	194 C2	Â	210 D2	Ò	226 E2	â	242 F2	ò
	131 83	83	147 93	S _{TS}	163 A3	£	179 B3	³	195 C3	Ã	211 D3	Ó	227 E3	ã	243 F3	ó
	132 84	I _{ND}	148 94	C _{CH}	164 A4	¤	180 B4	´	196 C4	Ä	212 D4	Ô	228 E4	ä	244 F4	ô
	133 85	N _{EL}	149 95	M _W	165 A5	¥	181 B5	µ	197 C5	Å	213 D5	Õ	229 E5	å	245 F5	õ
	134 86	S _{SA}	150 96	S _{PA}	166 A6		182 B6	¶	198 C6	Æ	214 D6	Ö	230 E6	æ	246 F6	ö
	135 87	E _{SA}	151 97	E _{PA}	167 A7	§	183 B7	·	199 C7	Ç	215 D7	×	231 E7	ç	247 F7	÷
	136 88	H _{TS}	152 98	9 ₈	168 A8	"	184 B8	¸	200 C8	È	216 D8	Ø	232 E8	è	248 F8	ø
	137 89	H _{TJ}	153 99	9 ₉	169 A9	©	185 B9	¹	201 C9	É	217 D9	Ù	233 E9	é	249 F9	ù
	138 8A	V _{TS}	154 9A	9 _A	170 AA	ª	186 BA	º	202 CA	Ê	218 DA	Ú	234 EA	ê	250 FA	ú
	139 8B	P _{LD}	155 9B	C _{SI}	171 AB	«	187 BB	»	203 CB	Ë	219 DB	Û	235 EB	ë	251 FB	û
	140 8C	P _{LU}	156 9C	S _T	172 AC	¬	188 BC	¼	204 CC	Ì	220 DC	Ü	236 EC	ì	252 FC	ü
	141 8D	R _I	157 9D	O _{SC}	173 AD	—	189 BD	½	205 CD	Í	221 DD	Ý	237 ED	í	253 FD	ý
	142 8E	S _{S2}	158 9E	P _M	174 AE	®	190 BE	¾	206 CE	Î	222 DE	Þ	238 EE	î	254 FE	þ
	143 8F	S _{S3}	159 9F	A _{PC}	175 AF	—	191 BF	¿	207 CF	Ï	223 DF	ß	239 EF	ï	255 FF	ÿ

C1 CODES

GR CODES
ISO LATIN-1 SUPPLEMENTAL

Display Controls (Right Half) with C1 Codes

ASCII Character Set

Decimal → Hex →	32 20 (space)	48 30 0	64 40 @	80 50 P	96 60 ,	112 70 p
	33 21 !	49 31 1	65 41 A	81 51 Q	97 61 a	113 71 q
	34 22 "	50 32 2	66 42 B	82 52 R	98 62 b	114 72 r
	35 23 #	51 33 3	67 43 C	83 53 S	99 63 c	115 73 s
	36 24 \$	52 34 4	68 44 D	84 54 T	100 64 d	116 74 t
	37 25 %	53 35 5	69 45 E	85 55 U	101 65 e	117 75 u
	38 26 &	54 36 6	70 46 F	86 56 V	102 66 f	118 76 v
	39 27 '	55 37 7	71 47 G	87 57 W	103 67 g	119 77 w
	40 28 (	56 38 8	72 48 H	88 58 X	104 68 h	120 78 x
	41 29)	57 39 9	73 49 I	89 59 Y	105 69 i	121 79 y
	42 2A *	58 3A :	74 4A J	90 5A Z	106 6A j	122 7A z
	43 2B +	59 3B ;	75 4B K	91 5B [	107 6B k	123 7B {
	44 2C ,	60 3C <	76 4C L	92 5C \	108 6C l	124 7C
	45 2D —	61 3D =	77 4D M	93 5D]	109 6D m	125 7D }
	46 2E .	62 3E >	78 4E N	94 5E ^	110 6E n	126 7E ~
	47 2F /	63 3F ?	79 4F O	95 5F _	111 6F o	127 7F DEL

Any 94-character set loaded in GL also includes these two characters.

ASCII Character Set

DEC Supplemental Graphic Character Set

The DEC Supplemental Graphic character set contains 94 graphic characters, including accented characters for many national languages. This set is the default set loaded into GR when you start Reflection.

Decimal → Hex →	160 A0	176 B0 °	192 C0 À	208 D0 ¿	224 E0 à	240 F0 ¿
	161 A1 ¡	177 B1 ±	193 C1 Á	209 D1 Ñ	225 E1 á	241 F1 ñ
	162 A2 ¢	178 B2 ²	194 C2 Â	210 D2 Ò	226 E2 â	242 F2 ò
	163 A3 £	179 B3 ³	195 C3 Ã	211 D3 Ó	227 E3 ã	243 F3 ó
	164 A4 ?	180 B4 ?	196 C4 Ä	212 D4 Ô	228 E4 ä	244 F4 ô
	165 A5 ¥	181 B5 µ	197 C5 Å	213 D5 Õ	229 E5 å	245 F5 õ
	166 A6 ?	182 B6 ¶	198 C6 Æ	214 D6 Ö	230 E6 æ	246 F6 ö
	167 A7 §	183 B7 ·	199 C7 Ç	215 D7 Æ	231 E7 ç	247 F7 œ
	168 A8 □	184 B8 ?	200 C8 È	216 D8 Ø	232 E8 è	248 F8 ø
	169 A9 ©	185 B9 ¹	201 C9 É	217 D9 Ù	233 E9 é	249 F9 ù
	170 AA ¢	186 BA º	202 CA Ê	218 DA Ú	234 EA ê	250 FA ú
	171 AB «	187 BB »	203 CB Ë	219 DB Û	235 EB ë	251 FB û
	172 AC ?	188 BC ¼	204 CC Ì	220 DC Ü	236 EC ì	252 FC ü
	173 AD ?	189 BD ½	205 CD Í	221 DD Ÿ	237 ED í	253 FD ÿ
	174 AE ?	190 BE ?	206 CE Î	222 DE ?	238 EE î	254 FE ?
	175 AF ?	191 BF ¿	207 CF Ï	223 DF ß	239 EF ï	255 FF

■ Not part of the character set.

¿ In ReGIS mode, these characters appear as ■

DEC Multinational Character Set

ISO Latin-1 Supplemental Graphic Character Set

Decimal → Hex →	160 A0 (space)	176 B0 °	192 C0 À	208 D0 Ð	224 E0 à	240 F0 ò
	161 A1 ¡	177 B1 ±	193 C1 Á	209 D1 Ñ	225 E1 á	241 F1 ñ
	162 A2 ¢	178 B2 ²	194 C2 Â	210 D2 Ò	226 E2 â	242 F2 ò
	163 A3 £	179 B3 ³	195 C3 Ã	211 D3 Ó	227 E3 ã	243 F3 ó
	164 A4 ¤	180 B4 ´	196 C4 Ä	212 D4 Ô	228 E4 ä	244 F4 ô
	165 A5 ¥	181 B5 µ	197 C5 Å	213 D5 Õ	229 E5 å	245 F5 õ
	166 A6 ¦	182 B6 ¶	198 C6 Æ	214 D6 Ö	230 E6 æ	246 F6 ö
	167 A7 §	183 B7 ¨	199 C7 Ç	215 D7 ×	231 E7 ç	247 F7 ÷
	168 A8 ..	184 B8 ,	200 C8 È	216 D8 Ø	232 E8 è	248 F8 ø
	169 A9 ©	185 B9 ¹	201 C9 É	217 D9 Ù	233 E9 é	249 F9 ù
	170 AA º	186 BA º	202 CA Ê	218 DA Ú	234 EA ê	250 FA ú
	171 AB «	187 BB »	203 CB Ë	219 DB Û	235 EB ë	251 FB û
	172 AC ¬	188 BC ¼	204 CC Ì	220 DC Ü	236 EC ì	252 FC ü
	173 AD —	189 BD ½	205 CD Í	221 DD Ý	237 ED í	253 FD ý
	174 AE ®	190 BE ¾	206 CE Î	222 DE Þ	238 EE î	254 FE þ
	175 AF —	191 BF ¿	207 CF Ĭ	223 DF ß	239 EF ĩ	255 FF ÿ

ISO Latin-1 Supplemental Graphic Character Set

DEC Special Graphic Character Set

Decimal → Hex →	160 A0	176 B0 0	192 C0 @	208 D0 P	224 E0 ◆	240 F0 — SCAN 3
	161 A1 !	177 B1 1	193 C1 A	209 D1 Q	225 E1 ▩	241 F1 — SCAN 5
	162 A2 "	178 B2 2	194 C2 B	210 D2 R	226 E2 HT	242 F2 — SCAN 7
	163 A3 #	179 B3 3	195 C3 C	211 D3 S	227 E3 FF	243 F3 — SCAN 9
	164 A4 \$	180 B4 4	196 C4 D	212 D4 T	228 E4 CR	244 F4
	165 A5 %	181 B5 5	197 C5 E	213 D5 U	229 E5 LF	245 F5
	166 A6 &	182 B6 6	198 C6 F	214 D6 V	230 E6 °	246 F6 ⊥
	167 A7 ,	183 B7 7	199 C7 G	215 D7 W	231 E7 ±	247 F7 T
	168 A8 (	184 B8 8	200 C8 H	216 D8 X	232 E8 NL	248 F8
	169 A9)	185 B9 9	201 C9 I	217 D9 Y	233 E9 VT	249 F9 ≤
	170 AA *	186 BA :	202 CA J	218 DA Z	234 EA J	250 FA ≥
	171 AB +	187 BB ;	203 CB K	219 DB [	235 EB 1	251 FB π
	172 AC ,	188 BC <	204 CC L	220 DC \	236 EC 1	252 FC ≠
	173 AD —	189 BD =	205 CD M	221 DD]	237 ED L	253 FD £
	174 AE .	190 BE >	206 CE N	222 DE ^	238 EE †	254 FE •
	175 AF /	191 BF ?	207 CF O	223 DF (space)	239 EF — SCAN 1	255 FF

■ Not part of the character set.

DEC Special Graphic Character Set

DEC Technical Character Set

Decimal → Hex →	160 A0	176 B0	192 C0	208 D0	224 E0	240 F0
		}	∴	Π	⌌	π
161 A1	↓	⌋	∞	Ψ	α	ψ
162 A2	⌈	∠	∞	?	β	ρ
163 A3	—	\	+	Σ	χ	σ
164 A4	ı	/	Δ	?	δ	τ
165 A5	J	⌌	∇	?	ε	?
166 A6		⌌	Φ	√	φ	f
167 A7	⌈	⟩	Γ	Ω	Υ	ω
168 A8	⌊	?	..	Ξ	η	ξ
169 A9	⌋	?	≈	γ	ι	υ
170 AA	⌋	?	Θ	⊂	θ	ζ
171 AB	(	?	×	⊃	κ	←
172 AC	)	≤	Λ	∩	λ	↑
173 AD	)	≠	↔	U	?	→
174 AE	)	≥	⇒	∧	v	↓
175 AF	{	∫	≡	∇	∂	

■ Not part of the character set.

␣ In ReGIS mode, these characters appear as ■

DEC Technical Character Set

DEC Multinational to IBM PC Characters

When you receive multinational characters from the host, the characters that you see on your PC screen depend on your adapter:

- ▲ If you have an EGA, VGA, or MCGA adapter, the characters appear just as they do on a terminal.
- ▲ If you have a CGA, monochrome, or Hercules adapter, some of the characters are substituted.

To see how the multinational character set appears according to your adapter, refer to the *Programmer Reference Card* included in this manual.

The multinational character set does not correspond to the IBM character set that the PC uses. The following table shows what character is substituted for a given multinational character on the screen if you are using PC code page 437 and are *writing to disk* (with the command MSAVE, for instance).

Similarly, when sending display memory to a printer, the printer must have the multinational character set available in order to print the characters correctly.

Decimal Value	Multi-national	IBM PC (to disk)	Decimal Value	Multi-national	IBM PC (to disk)
160			175	¿	¿
161	í	í	176	°	°
162	¢	¢	177	±	±
163	£	£	178	²	²
164	¥	¥	179	³	³
165	¥	¥	180	¿	¿
166	¿	¿	181	μ	μ
167	§	§	182	¶	Ω
168	α	θ	183	•	•
169	©	c	184	¿	¿
170	ø	æ	185	ı	ı
171	«	«	186	œ	œ
172	¿	¿	187	»	»
173	¿	¿	188	¼	¼
174	¿	¿	189	½	½

Decimal Value	Multi-national	IBM PC (to disk)	Decimal Value	Multi-national	IBM PC (to disk)
190	Œ	;	224	à	à
191	¸	;	225	á	á
192	À	A	226	â	â
193	Á	A	227	ã	a
194	Â	A	228	ä	ä
195	Ã	A	229	å	å
196	Ä	Ä	230	æ	æ
197	Å	Å	231	ç	ç
198	Æ	Æ	232	è	è
199	Ç	Ç	233	é	é
200	È	E	234	ê	ê
201	É	É	235	ë	ë
202	Ê	E	236	ì	ì
203	Ë	E	237	í	í
204	Ì	I	238	î	î
205	Í	I	239	ÿ	ÿ
206	Î	I	240	Œ	;
207	Ï	I	241	ñ	ñ
208	Œ	;	242	ò	ò
209	Ñ	Ñ	243	ó	ó
210	Ò	O	244	ô	ô
211	Ó	O	245	õ	o
212	Ô	O	246	ö	ö
213	Õ	O	247	œ	ö
214	Ö	Ö	248	ø	φ
215	Œ	Ö	249	ù	ù
216	Ø	φ	250	ú	ú
217	Ù	U	251	û	û
218	Ú	U	252	ü	ü
219	Û	U	253	ÿ	ÿ
220	Ü	Ü	254	Œ	;
221	Ý	Y	255		
222	Œ	;			
223	ß	ß			

National Keyboards and Characters

A character set defines a given correspondence between codes 1 through 255 and a set of graphic symbols. The ASCII character set makes up the first 128 positions; the characters in this range are common to all of the IBM PC code pages and are the default values for VT character sets. The ASCII character set is illustrated on page 638.

The information in this appendix covers appropriate methods for displaying a character in Reflection that does *not* belong to the ASCII character set (such as national characters or symbols).

Entering National Characters

Some PCs have keyboards and keyboard drivers available for languages other than English. If the character you wish to type is on your keyboard, simply pressing the key produces the character. Reflection does nothing to alter the characters produced by your keyboard, regardless of what you have selected in the Language list box in the General Setup dialog box.

If a character is not on the keyboard you are using, there are two ways to produce it if you are in 8-bit mode (the Parity list box in the Datacomm Setup dialog box is set to 8/NONE):

- ▲ Use a *compose* sequence.
- ▲ Use the **[Alt]** key in combination with the numeric keypad to generate characters from the IBM extended character set.

Using the Compose Key

If a national character is not on the keyboard you are using, press **[Alt]-[F8]** followed by the two characters that make up the character. For example, to produce â, type **[Alt]-[F8]**, then a followed by ^ (**[Shift]-[6]**). Unless otherwise indicated, the order of the two characters does not matter. If an invalid compose character is entered, the **[Alt]-[F8]** sequence is ignored and a bell sounds. The letter S appears between the function key labels to indicate a compose sequence is in progress.

On some PCs the national keyboard does not include all the diacritical marks. To resolve this problem, the number keys 1 through 6 always act as the characters ` , ^ , ~ , ¨ , and ° when used in a compose sequence.

The following chart shows how to produce all the multinational characters. See pages 643 and 644 for a chart showing what character is substituted for a given multinational character on the screen if you are using PC code page 437 and are writing to disk.

Compose Sequences

Description	Character	Sequence
A acute	Á	A'
a acute	á	a'
A circumflex	Â	A^
a circumflex	â	a^
A grave	À	A'
a grave	à	a'
A ring	Å	A* or A°
a ring	å	a* or a°
A tilde	Ã	A~
a tilde	ã	a~
A diaeresis	Ä	A"
a diaeresis	ä	a"
A E ligature*	Æ	AE
a e ligature*	æ	ae
C cedilla	Ç	C,
c cedilla	ç	c,
E acute	É	E'
e acute	é	e'

* Must be entered in the order indicated.

Description	Character	Sequence
E circumflex	Ê	E^
e circumflex	ê	e^
E grave	È	E'
e grave	è	e'
E diaeresis	Ë	E"
e diaeresis	ë	e"
I acute	Í	I'
i acute	í	i'
I circumflex	Î	I^
i circumflex	î	i^
I grave	Ì	I'
i grave	ì	i'
I diaeresis	Ï	I"
i diaeresis	ï	i"
N tilde	Ñ	N~
n tilde	ñ	n~
O acute	Ó	O'
o acute	ó	o'
O circumflex	Ô	O^
o circumflex	ô	o^
O grave	Ò	O'
o grave	ò	o'
O slash	Ø	O/
o slash	ø	o/
O tilde	Ö	O~

Description	Character	Sequence
o tilde	õ	o~
Ö diaeresis	Ö	O"
ö diaeresis	ö	o"
Œ ligature*	Œ	OE
œ ligature*†	œ	oe
German sharp s	ß	ss
U acute	Ú	U'
u acute	ú	u'
U circumflex	Û	U^
u circumflex	û	u^
U grave	Ù	U'
u grave	ù	u'
U diaeresis	Ü	U"
ü diaeresis	ü	u"
Y diaeresis†	ÿ	Y"
y diaeresis	ÿ	y"
quotation mark	"	"(space)
number sign	#	++
apostrophe	'	'(space)
commercial at	@	a a or A A
opening bracket	[	((
closing bracket	]	))
backslash	\	// or /<
single quote	'	'(space)
opening brace	{	(-
closing brace	}	)-

* Must be entered in the order indicated.

† This compose sequence is valid only when the UPS set list box in the General Setup dialog box is configured for DEC, the default.

Description	Character	Sequence
vertical line		/^
tilde	~	~(space)
inverted !	¡	!!
cent sign	¢	c/ or C/ or c or C
pound sign	£	l- or L- or l= or L=
yen sign	¥	y- or Y- or y= or Y=
section sign	§	so or SO or S! or s! or sØ or SØ
currency sign	¤	xo or XO or xØ or XØ
copyright sign	©	co or CO or cØ or CØ
feminine ordinal indicator	ª	a_ or A_
angle quotation mark left	«	<<
angle quotation mark right	»	>>
degree sign	°	Ø^
plus minus sign	±	+ -
superscript 1	¹	1^
superscript 2	²	2^
superscript 3	³	3^
micron*	µ	/u or /U
paragraph sign	¶	p! or P!
middle dot	•	.^
masculine ordinal indicator	º	o_ or O_
one-quarter fraction*	¼	1 4
one-half fraction*	½	1 2
inverted ?	¿	??

* Must be entered in the order indicated.

The next compose sequences are available only if the UPS Set list box in the General Setup dialog box is set to *LATIN-1*.

Compose Sequences: ISO Characters

Description	Character	Sequence
No break space		(space)(space)
Broken vertical bar*		or !^
Diaeresis (umlaut)*	..	" " or "(space)
Logical not*	¬	¬,
Multiplication symbol	×	xx
Division symbol	÷	÷:
Soft (syllable) hyphen	-	--
Registered trademark	®	RO
Macron	-	-^ or _^
Acute accent	´	”
Three quarters*	¾	34
Uppercase Icelandic Eth	Ð	D-
Lowercase Icelandic Eth*	ð	d-
Uppercase Icelandic thorn*	Þ	TH
Lowercase Icelandic thorn	þ	th
Uppercase Y acute	Ý	Y’
Lowercase y acute	ý	y’
Cedilla	¸	”

During a compose sequence ①, ②, ③, ④, ⑤, and ⑥ on the main keyboard (not the keypad) act as accent characters to accommodate national keyboards and drivers that do not provide all of the diacritical marks. These marks are as follows:

- ① `
- ② ´
- ③ ^
- ④ ~
- ⑤ ..
- ⑥ °

* Must be entered in the order indicated.

Generating Characters from the IBM Extended Set

In DOS, the **[Alt]** key can be used with the numeric keypad to generate characters from the IBM extended character set.

For instance, if you hold down **[Alt]** and then press **[1]**, **[4]**, and **[2]** in succession on the numeric keypad, you produce an **Ä** with a diaeresis: **Ä** (in code page 437, **Ä** is character 142 in the IBM extended character set).

When you are running Reflection 2 or Reflection 4, the numeric keypad is usually used for emulating VT functions: **[Alt]-[4]** is **[Select]**, **[Alt]-[5]** is **[Prev]**, **[Alt]-[7]** is **[Find]**, and so on.

To generate characters from the IBM extended character set, you must hold down both **[Alt]** and **[Shift]** as you type the number sequence.

The Parity list box in the Datacomm Setup dialog box must be set to **8/NONE**.

National Characters in 7-Bit Operation

National characters are transmitted using either the multinational character set or a specific national replacement character set. Multinational characters are 8 bits long.

To send and receive multinational characters, set the Parity list box in the Datacomm Setup dialog box to 8 data-bits.

When only 7 data-bits are available, the 8th bit of each byte is used for parity and is not available for use as data, and so the multinational characters, which use the 8th bit, cannot be directly sent or received.

This problem is partially solved on some host systems with national replacement character sets. When the NRC list box in the General Setup dialog box is set to a value other than **NONE (US)**, some characters in the USASCII character set are replaced by certain characters from the multinational extension as shown in the next figure. Set this field only if you are sure that your host recognizes national replacement characters.

If you are operating with 7 data-bits, some ASCII characters that have been replaced by national characters cannot be used. Also, any multinational characters that are not in the next figure cannot be used. The keyboard bell sounds if you try to enter these characters using either a compose sequence (**[Alt]-[F8]**) or a keyboard driver.

NRC Set	Characters											
ASCII Decimal	35	64	91	92	93	94	95	96	123	124	125	126
U.S. ASCII	#	@	[	\	]	^	_	`	{		}	~
British	£	@	[	\	]	^	_	`	{		}	~
Canadian	#	à	â	ç	ê	î	_	ô	é	ù	è	û
Dutch	£	ı [*]	ÿ ^{**}	1/2		^	_	`	"	f	1/4	'
Finnish	#	@	Ä	Ö	Å	Ü	_	é	ä	ö	å	ü
French	£	à	°	ç	§	^	_	`	é	ù	è	"
German	#	§	Ä	Ö	Ü	^	_	`	ä	ö	ü	ß
Italian	£	§	°	ç	é	^	_	ù	à	ò	è	ì
Norwegian/Danish	#	@	Æ	Ø	Å	^	_	`	æ	ø	å	~
Portuguese	#	@	Ã	Ç	Õ	^	_	`	ã	ç	õ	~
Spanish	£	§	ı	Ñ	ı	^	_	`	°	ñ	ç	~
Swedish	#	É	Ä	Ö	Å	Ü	_	é	ä	ö	å	ü
Swiss	ù	à	é	ç	ê	î	è	ô	ä	ö	ü	û

* The ı represents 3/4

** The ÿ represents ij

Reflection stores multinational characters in display memory. However, the IBM PC character set does not include all the multinational characters. During output operations to disk, multinational characters are converted to the IBM PC character set. Reflection uses the substitution shown on pages 643 and 644 when the PC's code page is 437. During printer operations (if the Pass Through Conversion check box in the Printer Setup dialog box is selected), the kind of conversion done depends on what type of printer is configured in the Control Codes list box.

Similarly, when national characters are written to or read from disk files, they are converted to either the multinational or IBM character set.

Code Page Support

The character set available on the PC depends on the active code page. By default, DOS uses the code page that comes with your PC—this is the *hardware code page*. For example, code page 437 is used in the United States.

MS-DOS (Version 3.30 and above) provides support for code page switching. “Code page” is synonymous with “character set” and defines a given correspondence between the codes 0–255 and a set of 256 graphic symbols. The ASCII character set makes up the first 128 positions of all the IBM PC code pages. It is in the definition of the high-order 8-bit codes (128–255) that the various code pages differ.

At startup, Reflection automatically detects the presence of the following code pages on the PC and translates accordingly between the PC and the host character set:

Code Page	Character Set
CP437	U.S.
CP850	Multilingual
CP860	Portuguese
CP863	Canadian-French
CP865	Nordic

DOS may not recognize that you have a code page loaded—your version of DOS may be earlier than 3.3, for example. You can force Reflection to recognize your code page with a startup switch:

Use this switch...	For this code page
/L860	CP860
/L863	CP863
/L865	CP865

If the current DOS code page is not one that Reflection supports, then code page 437 is assumed.

You may need a national character from your host character set that is not available in your current code page. To avoid this problem, you may need to set up your PC to allow switching to another code page, such as 850. Code page 850, the Multilingual code page, has the greatest number of characters that are in common with the DEC Multinational Character set. Use the guidelines below to prepare a PC code page.

Preparing a PC Code Page

Below are sample CONFIG.SYS and AUTOEXEC.BAT entries for a French Canadian user running CP863 on a system equipped with an EGA and an IBM Proprinter.

```
[CONFIG.SYS]
```

```
COUNTRY=002,863,C:\DOS\COUNTRY.SYS  
DEVICE=C:\DOS\DISPLAY.SYS CON=(EGA,863)  
DEVICE=C:\DOS\PRINTER.SYS PRN=(4201,863,1)
```

```
[AUTOEXEC.BAT]
```

```
NLSFUNC C:\DOS\COUNTRY.SYS  
MODE CON CP PREPARE=((863) C:\DOS\EGA.CPI)  
MODE CON CP SELECT=863  
MODE PRN CP PREPARE=((863) C:\DOS\4201.CPI)  
MODE PRN CP SELECT=863  
KEYB CF 863 C:\DOS\KEYBOARD.SYS
```

The next CONFIG.SYS and AUTOEXEC.BAT entries are for a Swedish user running CP850 on a system equipped with an EGA and an IBM Proprinter.

```
[CONFIG.SYS]
```

```
COUNTRY=046,850,C:\DOS\COUNTRY.SYS  
DEVICE=C:\DOS\DISPLAY.SYS CON=(EGA,850)  
DEVICE=C:\DOS\PRINTER.SYS PRN=(4201,850,1)
```

```
[AUTOEXEC.BAT]
```

```
NLSFUNC C:\DOS\COUNTRY.SYS  
MODE CON CP PREPARE=((850) C:\DOS\EGA.CPI)  
MODE CON CP SELECT=850  
MODE PRN CP PREPARE=((850) C:\DOS\4201.CPI)  
MODE PRN CP SELECT=850  
KEYB SV 850 C:\DOS\KEYBOARD.SYS
```

See your DOS manual for more information about code pages.

Configuring Character Translation

During output operations to the PC disk, characters from the VMS host are actually converted to the IBM PC character set (using the active code page). Similarly, when IBM characters are read from PC disk files, they are converted to the host character set.

If character translation should not be performed in order to completely preserve what is being read from or written to disk, set `DISABLE-TRANSLATION` to `YES`. However, the translation of characters that come from the keyboard or from the host computer is not affected by the value of `DISABLE-TRANSLATION`. For keyboard translation, see `SET DISABLE-TRANSLATION-KB` in the *Reflection Command Language* manual.

Translation to Disk

Input	Disable Translation	To Disk
DEC MCS	NO	IBM
DEC MCS	YES	DEC MCS
NRC	NO	IBM
NRC	YES	NRC

During printer operations (if the Pass Through Conversion check box in the Printer Setup dialog box is selected), the kind of conversion done depends on what type of printer is configured in the Control Codes list box in the same dialog box.

See below for a summary of Reflection's translation of national characters sent to a printer.

Printer Support for National Characters

There are two possible sources of characters sent to a printer:

- ▲ From Reflection's display memory, where characters are stored in the character set of the host (for example, ISO Latin-1). See the table on page 329 for a summary of the translation performed for DEC characters sets when printing from display memory.

- ▲ The PC itself (from a disk file or the keyboard). When printing a file from disk, the character set is translated by default. If the source of the disk file is a host character set (like MCS or Latin-1), use the following SET command to keep this translation from occurring:

```
SET DISABLE-TRANSLATION YES
```

Reflection attempts to translate characters to the character set of your local printer based on the selection you have made in the Control Codes list box in the Printer Setup dialog box. For example:

- ▲ Selecting *IBM PRO* or *DJET500C* indicates that the printer font matches the code page being used by the PC. See page 278.
- ▲ Selecting *DEC* in the Control Codes list box in the Printer Setup dialog box indicates that the printer font matches the DEC multinational character set.

Conversion During File Transfer

File transfers can be configured to convert 8-bit characters to 7-bit characters and vice versa. Under the defaults, DEC multinational characters are translated during the file transfer to the IBM character set as shown by the chart on page 643. See “Change MCS to NRC” (multinational character set to national replacement character) and “Change NRC to MCS” on pages 198 and 200.

Character Set Conversion

CHARTRAN is a translation utility program that converts the characters in a file from the DEC MCS or Latin-1 character sets to IBM code page 437 or 850 and vice versa. It has a number of pre-defined translation tables. The type of table is specified by a switch added to the CHARTRAN command. Type CHARTRAN at the DOS prompt with no parameters to see a summary of the options.

```
CHARTRAN /<switch> <source file> <destination file>
```


The possible values of *<switch>* are as follows:

/3

Translates DEC (MCS) to IBM (code page 437).

/4

Translates IBM (code page 437) to DEC (MCS).

/7

Translates DEC (ISO Latin-1) to IBM (code page 850).

/8

Translates IBM (code page 850) to DEC (ISO Latin-1).

The other values for *<switch>* (*/1*, */2*, */5*, and */6*) apply only to translating from or to the HP Roman 8 character set.

/H

General help information.

/F=<filename>

CHARTRAN can accept a user-defined translation table. The table file must contain 256 entries. Each entry must be in the form *<nnn>*, where *<nnn>* is a right-justified, zero-filled number. The numbers may run together or they may be separated by any non-numeric character.

For example, if the first three entries in your translation table are 001,012,245, character number 0 is translated to 001, the second character is translated to 012, and the third one is translated to 245.

The entries may be placed on multiple lines, but each entry must reside entirely on one line. Comments may be placed in the file, but must be enclosed in single or double quotes.

The data in the *<source file>* is converted from one character set to another and then stored in the *<destination file>*.

Another Reflection feature lets you create customized translation tables. The startup switch */L:<filename>* lets you specify which character codes are used to display characters on the screen, store characters in a disk file, send characters to the host from the keyboard or a PC disk file, and translate characters during an ASCII file transfer. It also lets you specify the default character set mapping.

This feature presupposes a good working knowledge of how DEC character sets work, how to map character sets, and knowledge of PC character sets and hardware. Refer to XLAT.DOC on your product disks.

New User Interface Locations

This appendix provides a reference for users of pre-5.0 versions of Reflection. It is intended to help you find the new dialog box locations of Reflection setup fields. Each of the pre-5.0 setup screens is shown with a table that lists the new dialog box location for each field. If a setup field has been renamed, the new name is shown. If a setup field has been replaced by a Reflection SET command, the command is given.

BASIC SET-UP

Datacomm port	COM1
Baud rate	9600
Data-bits/parity	8/NONE

NEXT
CHOICE

PREVIOUS
CHOICE

DEFAULT
VALUES

ACTIVE
VALUES

ACTIVATE

SAVE
TO DISK

Exit
Set-Up

Basic Setup Screen

Field Name	Dialog Box Location (New Field Name)
Datacomm port	Basic Setup (Connection Type)
Baud rate	Basic Setup
Data-bits/parity	Basic Setup (Parity)

DATACOMM SET-UP	
Datacomm port	COM1
Baud rate	9600
Data-bits/parity	8/NONE
Check parity	NO
Receive pacing	XON/XOFF
Transmit pacing	XON/XOFF
CTS required	NO
DSR required	NO
Stop bits	1
Session# (LAN)	1

NEXT CHOICE

PREVIOUS CHOICE

DEFAULT VALUES

ACTIVE VALUES

ACTIVATE

SAVE TO DISK

Exit Set-Up

Field Name	Dialog Box Location (New Field Name)
Datacomm port	Datacomm Setup (Connection Type)
Baud rate	Datacomm Setup
Data-bits/parity	Datacomm Setup (Parity)
Check parity	Datacomm Setup
Receive pacing	Advanced Datacomm Setup
Transmit pacing	Advanced Datacomm Setup
CTS required	Advanced Datacomm Setup
DSR required	Advanced Datacomm Setup
Stop bits	Advanced Datacomm Setup
Session # (LAN)	Advanced Datacomm Setup

TERMINAL SET-UP, PAGE 1			
Remote mode	YES	Scrolling speed	MAXIMUM
Multi page	YES	Right margin	80
Terminal type	UT400-7	132 column adapter	NONE
DA response	UT340	Cols/ horizontal scroll	10
Local echo	NO	Character xmit delay	0
Language	ENGLISH	Line xmit delay	0
National replacement set	NONE	Hot key	ALT-RSH
Use national replacement	NO	Requested display memory	10
Initial label set	MAINMENU	Actual display memory	10
EGA character sets	ALL	(both in Kbytes)	

NEXT CHOICE	PREVIOUS CHOICE	DEFAULT VALUES	ACTIVE VALUES	ACTIVATE	SAVE TO DISK	Exit Set-Up
----------------	--------------------	-------------------	------------------	----------	-----------------	----------------

Terminal Setup, Page 1 Screen

Field Name

Remote mode
 Multi page
 Terminal type
 DA response
 Local echo
 Language
 National replacement set
 Use national replacement
 Initial label set
 EGA character sets
 Scrolling speed
 Right margin
 132 column adapter
 Cols/horizontal scroll
 Character xmit delay
 Line xmit delay
 Hot key
 Requested display memory
 Actual display memory

Dialog Box Location (New Field Name)

General Setup (Online)
 Replaced by SET MULTI-PAGE
 General Setup (Mode)
 General Setup (Terminal ID)
 Keyboard Setup
 General Setup
 General Setup (NRC Set)
 General Setup (Use NRC 7-Bit Chars)
 Display Setup (Initial Function Keys)
 Video Options Setup
 Video Options Setup
 Display Setup
 Display Setup
 Replaced by SET COLUMNS-PER-SCROLL
 Advanced Datacomm Setup
 Advanced Datacomm Setup
 Keyboard Setup
 Advanced Display Setup
 Advanced Display Setup

TERMINAL SET-UP, PAGE 2

Display controls	NO
Automatic linefeed	NO
End of line wrap	NO
Screen background	DARK
User defined keys	UNLOCKED
User features	UNLOCKED
Keypad mode	NORMAL
Cursor key mode	NORMAL
XOFF on mode switch	YES

Caps lock	NO
Auto repeat	YES
Margin bell	YES
Warning bell	YES
Break key enabled	YES
Conceal answerback	NO
Answerback message	

NEXT CHOICE	PREVIOUS CHOICE	DEFAULT VALUES	ACTIVE VALUES
----------------	--------------------	-------------------	------------------

ACTIVATE	SAVE	DISPLAY	Exit
	TO DISK	CONTROLS	Set-Up

Terminal Setup, Page 2 Screen

Field Name

Display controls
 Automatic linefeed
 End of line wrap
 Screen background
 User defined keys
 User features
 Keypad mode
 Cursor key mode
 XOFF on mode switch
 Caps lock
 Auto repeat
 Margin bell
 Warning bell
 Break key enabled
 Conceal answerback
 Answerback message

Dialog Box Location (New Field Name)

Display Setup (Control Characters)
 General Setup (New Line)
 Display Setup (Autowrap)
 Display Setup (Reverse Background)
 General Setup (User-Defined Keys Locked)
 General Setup (User Features Locked)
 General Setup (Keypad)
 General Setup (Cursor Keys)
 Video Options Setup
 Keyboard Setup
 Keyboard Setup
 Keyboard Setup
 Keyboard Setup
 Keyboard Setup (Break)
 Answerback Setup
 Answerback Setup

TERMINAL SET-UP, PAGE 3

Status line type	NONE
Cursor style	LINE
Cursor visible	YES
Backarrow key	DELETE
Compose key	ENABLED
User preferred set	DEC
Use ANSI color	NO
ANSI screen color	BLACK

Display rows	24
Page memory arrangement	AUTO
Vertical coupling	YES
Page coupling	YES
Horizontal coupling	YES
Macro storage (K)	10

NEXT
CHOICE

PREVIOUS
CHOICE

DEFAULT
VALUES

ACTIVE
VALUES

ACTIVATE
TO DISK

Exit
Set-Up

Terminal Setup, Page 3 Screen**Field Name**

Status line type

Cursor style

Cursor visible

Backarrow key

Compose key

User preferred set

Use ANSI color

ANSI screen color

Display rows

Page memory arrangement

Vertical coupling

Page coupling

Horizontal coupling

Macro Storage (K)

Dialog Box Location (New Field Name)

Display Setup

Display Setup (Cursor)

Display Setup (Cursor)

Keyboard Setup (Backspace Key Sends)

Keyboard Setup

General Setup (UPS Set)

Replaced by SET USE-ANSI-COLOR
and Mode field in General SetupReplaced by SET ANSI-SCREEN-COLOR
and Mode field in General Setup

Display Setup

Advanced Display Setup

Advanced Display Setup

Advanced Display Setup

Advanced Display Setup

General Setup

PRINTER SET-UP, GENERAL			
Printer interface	PARALLEL	Driver name	N/A
File name	N/A		

Control codes	IBM PRO	Lines per page	8
Pass through conversion	YES	Print size	NOCHANGE
Printer mode	NORMAL	Baud rate (serial)	N/A
Form Feed after PrtSc	YES	Data-bits/parity(serial)	N/A
Buffer size (K bytes)	8	Flow control (serial)	N/A
Print Region	PAGE	Stop bits (serial)	N/A

NEXT CHOICE	PREVIOUS CHOICE	DEFAULT VALUES	ACTIVE VALUES	ACTIVATE TO DISK	SAVE TO DISK	Exit Set-Up
-------------	-----------------	----------------	---------------	------------------	--------------	-------------

Dialog Box Location (New Field Name)

Printer interface	Printer Setup
Driver name	Printer Setup
File name	Printer Setup
Control codes	Printer Setup
Pass through conversion	Printer Setup
Printer mode	Printer Setup (Print Mode)
Form feed after PrtSc	Printer Setup (Auto Form Feed)
Buffer size (K bytes)	Printer Setup
Print region	Printer Setup
Print screen mode (R2)	Printer Setup (Print Type)
Lines per page	Printer Setup
Print size	Printer Setup
Baud rate (serial)	Serial Printer Setup
Data-bits/parity (serial)	Serial Printer Setup
Flow control (serial)	Serial Printer Setup
Stop bits (serial)	Serial Printer Setup
Graphics print mode (R2)	Printer Setup (Graphics Print)

FILE TRANSFER SET-UP			
File transfer protocol		WRQ	
Host startup sequence		RUN VAXLINK2	
Receive timeout (seconds)	15	Error retry limit	10
Packet size	512	File transfer link	8-BIT

ASCII TRANSLATION TO HOST		ASCII TRANSLATION FROM HOST	
CR/LF = Record separator	YES	Record separator = CR/LF	YES
Expand embedded tabs	YES	Change spaces to tabs	NO
Use ctrl-Z as EOF	YES	Write ctrl-Z EOF	YES
Change MCS to NRC	NO	Delete trailing spaces	YES
		Change NRC to MCS	NO

NEXT CHOICE	PREVIOUS CHOICE	DEFAULT VALUES	ACTIVE VALUES
----------------	--------------------	-------------------	------------------

ACTIVATE	SAVE TO DISK	DISPLAY CONTROLS	Exit Set-Up
----------	-----------------	---------------------	----------------

File Transfer Setup Screen

Field Name

File transfer protocol
 Host startup sequence
 Receive timeout (seconds)
 Packet size
 Error retry limit
 File transfer link

Dialog Box Location (New Field Name)

File Transfer Setup (Transfer Protocol)
 File Transfer Setup
 File Transfer Setup
 File Transfer Setup (Frame Size)
 File Transfer Setup
 File Transfer Setup (Transfer Link)

ASCII Translation To Host**Field Name**

CR/LF = Record separator
 Expand embedded tabs
 Use ctrl-Z as EOF
 Change MCS to NRC

Dialog Box Location (New Field Name)

ASCII File Transfer Options Setup
 ASCII File Transfer Options Setup
 (Change Tabs to Spaces)
 ASCII File Transfer Options Setup
 (Read Ctrl-Z as EOF)
 ASCII File Transfer Options Setup

ASCII Translation From Host**Field Name**

Record separator = CR/LF
 Change spaces to tabs
 Write ctrl-Z EOF

Delete trailing spaces
 Change NRC to MCS

Dialog Box Location (New Field Name)

ASCII File Transfer Options Setup
 ASCII File Transfer Options Setup
 ASCII File Transfer Options Setup
 (Write Ctrl-Z at EOF)
 ASCII File Transfer Options Setup
 ASCII File Transfer Options Setup

VIDEO SET-UP	
Blink characters in graphics mode	YES
Blink characters in text mode	YES
Hardware scrolling method	PARTIAL
Initial screen mode	GRAPHICS
Resolution choice	UGA [AD MF] 640 x 480
Legend: [ECD] = Enhanced Color Display [AD] = Analog (UGA) Display [MF] = Multi-frequency Display	
NEXT CHOICE	PREVIOUS CHOICE DEFAULT VALUES ACTIVE VALUES ACTIVATE SAVE TO DISK Exit Set-Up

Video Setup Screen**Field Name**

Blink characters in graphics mode
 Blink characters in text mode (R2)
 Hardware scrolling method
 Initial screen mode (R2)
 Resolution choice
 Maintain unscaled image (R4)

Dialog Box Location (New Field Name)

Video Options Setup
 (Blink in Graphics Mode)
 Color Setup (Enable Text Blink)
 Video Options Setup
 Video Options Setup (Initial Video Mode)
 Video Options Setup
 Video Options Setup

The screenshot shows a terminal window titled "Color Setup Screen". On the left, a box labeled "Select Item to Configure" contains a list: "Screen", "Func Keys/Inverse", and "Host Attributes". To the right, a box labeled "Text Mode Color Set-Up" contains the text "Username: USER", "Password:", "Last interactive login", and "\$ _". Below this, three buttons are labeled "FKEY1", "FKEY2", and "FKEY3". In the center, a box labeled "SAMPLE SCREEN" contains the text: "Cursor down or up to indicate whether you wish to change colors for the Screen, Function Keys or Host Attributes. Then press F2 to select color for that item." At the bottom, there are four buttons: "select color", "ACTIVATE", "SAVE TO DISK", and "Exit Set-Up".

Color Setup Screen

Field Name

Select item to configure
 Select color
 Enable blink

Dialog Box Location (New Field Name)

Color Setup (Screen Element)
 Color Setup (Select Color)
 Color Setup (Enable Text Blink)

SOFTKEY SET-UP

Softkey	Action	Label	Definition
1	NORMAL	S1	
2	NORMAL	S2	
3	NORMAL	S3	
4	NORMAL	S4	
5	NORMAL	S5	
6	NORMAL	S6	
7	NORMAL	S7	
8	NORMAL	S8	

1	NORMAL	S1	
2	NORMAL	S2	
3	NORMAL	S3	
4	NORMAL	S4	
5	NORMAL	S5	
6	NORMAL	S6	
7	NORMAL	S7	
8	NORMAL	S8	

NORMAL: Transmitted as if entered on the keyboard

LOCAL: Processed as if received from the host

COMMAND: Processed as a Reflection command

NEXT
CHOICEPREVIOUS
CHOICEDEFAULT
VALUESSAVE
TO DISKDISPLAY
CONTROLSExit
Set-Up

Softkey Setup Screen

Field Name

Softkey
Action
Label
Definition
Display Controls

Dialog Box Location (New Field Name)

Softkey Setup (Softkey To Configure)
Softkey Setup (Attribute)
Softkey Setup
Softkey Setup (Key String)
Softkey Setup (Insert Special Characters)

T	T	T	T	T	T	T	T	T	T
1234567890123456789012345678901234567890123456789012345678901234567890									

SET TAB	CLEAR TAB	DEFAULT TABS	CLR ALL TABS	SAVE TO DISK	TAB = SPACES	Exit Set-Up
------------	--------------	-----------------	-----------------	-----------------	-----------------	----------------

Tabs Setup Screen

Field Name**Dialog Box Location (New Field Name)**

Set tab

Tab Setup (use new tab ruler)

Clear tab

Tab Setup (use new tab ruler)

Default tabs

Tab Setup (Defaults)

Clear all tabs

Tab Setup (Clear All)

DIALER CONFIGURATION	
System 1 Name	
Phone Number	
Logon RCL File is optional. If specified, it is the name of a command file to be executed after dialing. Such a command file could be used to automate logging on, for example.	
Logon RCL File	
ACTIVE VALUES	SAVE TO DISK
	EXIT

Modem Dialer Setup Screen

Field Name**Dialog Box Location (New Field Name)**

System # name

Modem Dialer Setup (Description)

Phone number

Modem Dialer Setup

Logon RCL file

Modem Dialer Setup

Auto Enter character	NONE
Virtual screen	NO
CR Effect	CR
LF Effect	LF
DEL	Lo Y
GIN Terminator	CR
Page Full Break	NO
Page Full Busy	NO
Destructive Overwrite	NO

Exit Set-Up

Tektronix Setup Screen

Field Name

Auto enter character
Virtual Screen
CR effect
LF effect
DEL
GIN terminator
Page full break
Page full busy
Destructive overwrite

Dialog Box Location (New Field Name)

[illegible]

ReGIS SET-UP	
Graphics terminal type	VT340
Initial screen mode	TEXT
Auto exit graphics mode	NO
Auto enter graphics mode	NO
Enable sixel scrolling	YES
# Bit planes saved, each: 37K	0
Enable graphics output cursor	YES
Enable macrograph reports	YES
# Downloadable character sets	3

NEXT CHOICE	PREVIOUS CHOICE	DEFAULT VALUES	ACTIVE VALUES	ACTIVATE	SAVE TO DISK	Exit Set-Up
----------------	--------------------	-------------------	------------------	----------	-----------------	----------------

Regis Setup Screen**Field Name**

Graphics terminal type
 Initial screen mode
 Auto exit graphics mode
 Auto enter graphics mode
 Enable sixel scrolling
 # Bit planes saved
 Enable graphics output cursor
 Enable macrograph reports
 # Downloadable character sets

Dialog Box Location (New Field Name)

ReGIS Setup (Terminal Type)
 Video Options Setup (Initial Video Mode)
 ReGIS Setup
 ReGIS Setup
 ReGIS Setup
 ReGIS Setup
 ReGIS Setup
 ReGIS Setup
 ReGIS Setup

PRINTER SET-UP, GRAPHICS

Print graphics	YES
Graphics print mode	COMPRESS
Print background	NO
Sixel destination	PRINTER
Sixel graphics level	LEVEL 1
Sixel color printing	MONO
Sixel color system	HLS

Printer Setup (Graphics) Screen

Field Name

Print graphics
 Graphics print mode
 Print background
 Sixel destination
 Sixel graphics level
 Sixel color printing
 Sixel color system

Dialog Box Location (New Field Name)

Graphics Printing Setup
 Graphics Printing Setup (Print Mode)
 Graphics Printing Setup
 Graphics Printing Setup (Destination)
 Graphics Printing Setup (Graphics Level)
 Graphics Printing Setup (Color Printing)
 Graphics Printing Setup (Color Specification)

Item to Configure	Fgd	Bgd	Blink	Undln
Screen	8	0	NO	NO
Func Keys/Inverse	10	7	NO	NO
Host Attributes				

Move the cursor up and down to select the item to configure. Then move the cursor right and use F1 and F2 to select background and foreground color numbers. Use F7 to change the colors associated with the color numbers.

If Undln is YES, the item will be underlined in graphics mode, although the underline won't appear on this screen.

Username: USER
Password:
Last interactive login
\$ _

FKEY1 FKEY2 FKEY3

Sample Screen

Color Numbers 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
For Fgd and Bgd

NEXT CHOICE PREVIOUS CHOICE DEFAULT VALUES ACTIVE VALUES ACTIVATE TO DISK SAVE ColorMap Set-Up Exit Set-Up

Graphics Mode Color Setup Screen

Field Name

Item to configure
Color numbers for FGD and BGD
Color Map Set-Up

Dialog Box Location (New Field Name)

Graphics Color Setup (Screen Element)
Graphics Color Setup (Select Color)
Graphics Color Setup (Palettes)



Glossary

ACK

(Acknowledge) A character sent to acknowledge the receipt of information. Compare *ENQ*.

alpha mode

The PC's video card can be set to either a text (alpha) or graphics state. In Reflection the **[Alt]-[G]** keystroke, which enters Tektronix mode, toggles the graphics mode. **[Alt]-[V]** toggles graphics in Reflection 4. See also *alphanumeric mode*.

alphanumeric cursor

Underline character that indicates where the next character will be placed.

alphanumeric mode

Screen mode in which alphabetic characters, numerals, and other symbols are sent to the screen from the keyboard.

[Alt]

Alternate. A key which, when pressed, signals to the computer a change in the meanings of other keys struck simultaneously.

ANSI

(American National Standards Institute) A group that defines U.S. standards for the information processing industry.

API

(Application Program Interface) A software interface for communications between a programming language and an application to give transparent access to the application's services, such as those for network devices, files, or interprocess communications.

ASCII

(American Standard Code for Information Interchange) The most common coding system for converting letters, numerals, and other symbols into a form usable by a computer and its peripherals. See pages 636 and 637 for a complete table of the ASCII character set, including display codes.

ASCII file transfer

A 7-bit transfer of text files that are presented in ASCII form.

asynchronous communications

An operation performed on demand, rather than at a specified time or after a specified interval, as in synchronous communications. In asynchronous data transmission, data is sent without regard to external timing; this is also called *start-stop* data transmission.

baud rate

The rate at which data is transmitted. At low speeds, equivalent to bits per second. At higher speeds, the bits per second measurement is higher than the baud rate, since one baud can be made to represent more than one bit. See *BPS*.

beam

The last endpoint marks the current beam position (Tektronix emulation only).

binary

Meaning two; the fundamental principle behind digital computers. All input to the computer is converted into binary numbers made up of the two digits 0 and 1 (bits). For example, when you press an unshifted **A** on your PC, the keyboard generates and transmits the number 01100001.

binary digit

See *bit*.

binary file transfer

A file transfer mode that transmits a file containing binary characters without loss of data. Compare *ASCII file transfer*.

bit

Short for binary digit, the smallest unit of information in a computer system. Each bit has a value of 0 or 1. A collection of eight bits is a byte.

bit-mapped graphics

When memory bits correspond to screen pixels, a graphics image is said to be bit-mapped. See *pixel*.

block

Set of continuous data characters and/or bytes transmitted as a unit.

boot

Load the operating system into the computer's memory.

BPS

Bits per second, the rate at which data is sent over a communications link. See *baud rate*.

byte

A group of eight binary digits (bits) that can be used to represent a letter, special character, or numeral.

carriage return

An ASCII character that causes the character following it to be displayed and/or printed at the first position of a line.

carrier signal

A signal that is set by a modem on pin 8 of an RS-232 cable to indicate that a connection is established with another modem, thus permitting data communications.

character mode

A mode of terminal operation in which each character is transmitted to the host computer as it is entered at the keyboard.

command variable

See *variable*.

configuration

The process of customizing a program to a user's preferences and equipment requirements. For example, a pre-packaged program, such as Reflection, can be set up to communicate with a host computer using either a direct cable connection, a modem, or a network.

control

See [Ctrl].

control character

A non-text character, such as a carriage return or linefeed, that signals the computer to perform an action or acknowledge a condition.

control function

Control functions are instructions to the terminal or to a PC running Reflection to perform some action. They are usually sent to a terminal from a host computer, but they can also be entered at the keyboard. They include escape sequences (beginning with ^ESC), control sequences (beginning with ^CSI), and device control strings (beginning with ^DCS).

control sequence

A character string beginning with ^CSI. Such a string constitutes a command, usually to the terminal, to perform some action. Control sequences are usually sent to a terminal from a host computer, but they can also be entered at the keyboard (press Esc followed by "[", as in this sequence, which sets the number of columns to 132: `DISPLAY ^[[?3h`). To express ^CSI in command language, use `"^[[?3h"`. Compare glossary entries *device control sequence* and *escape sequence*.

coordinates

A set of numbers that indicates horizontal and vertical position.

crosshair cursor

Graphics cursor that can be positioned with cursor keys. Primarily used in graphics input (GIN) mode.

Crystal Clear

Crystal Clear is a crystal oscillator from Walker Richer & Quinn for users with EGA cards. It lets you choose the resolution of your display (see "Resolution Choice" on page 249):

- ▲ 800×350 pixels, which is possible on any Enhanced Color Display
- ▲ 640×480 (requires a multi-frequency monitor)
- ▲ 800×500, which matches the resolution of the VT340 terminal (requires a multi-frequency monitor)

Crystal Clear is attached to your IBM EGA or compatible video board (a board with 256K of RAM is required) and does not require an extra slot in the PC.

Crystal Clear can be set to operate at either 20Mhz or 26.56 Mhz:

- ▲ If you are using 20Mhz Crystal Clear, the 800×350 resolution works on all monitors.

- ▲ If you are using 26.56Mhz Crystal Clear, the higher resolution choices of 640×480 and 800×500 may not work with an older EGA card.

CTERM

(Command terminal) Digital Equipment Corporation's protocol for terminal services over DECnet.

Ctrl

The Control key, also expressed as "␣". Holding down **Ctrl** changes the meaning of other keys struck simultaneously.

CTS

(Clear to send) A signal set on modem pin 5 (RS-232 standard) and sent to a terminal/transmitting station indicating that the modem is ready to accept data for transmission. Compare *RTS*.

cursor

A symbol on the screen, in the form of a blinking line or rectangle, which indicates where the next typed character is displayed.

datacomm

Short for data communications, the act of transmitting data from its source to peripheral equipment (such as a printer) or to another computer. A data comm port is a device through which data enters or leaves a computer.

data set

A modem.

DCD

(Data carrier detect) A signal set on modem pin 8 (RS-232 standard) to indicate a connection has been established with another modem, permitting data communication.

DCE

(Data communications equipment) Installed equipment that provides all the functions required to establish, maintain and terminate a connection, and do the signal conversion and coding between the data terminal equipment and the common carrier's line, e.g., a data set or modem.

DCL

Digital command language that provides VMS users with a set of commands for program development, device and data manipulation, and program execution and control.

DECnet

Digital Equipment Corporation's group of networking protocols for connecting computers.

DECnet-DOS

Digital Equipment Corporation's networking protocols for connecting PCs running MS-DOS to DECnet. DECnet-DOS also includes LAT. See PCSA.

default

A value or instruction that operates automatically until a user specifies some other value or instruction. For example, the default disk drive of a PC is made active when a computer is turned on. Also, default setup values are operating instructions built into a software package. Default setup values can be changed to conform to user preferences or equipment requirements.

device control string

A character string beginning with ^DCS. Such a string constitutes a command, usually to the terminal, to perform some action. Device control sequences are usually sent to a terminal from a host computer, but they can also be entered at the keyboard (press **[Esc]** followed by "P" and then the sequence). To express ^DCS in command language, use [^][P, as in this sequence, which puts you in ReGIS mode: `DISPLAY "^[P3p"`. Compare glossary entries *control sequence* and *escape sequence*.

display

The computer's screen.

display memory

That portion of a computer's memory that receives data or the contents of a file and displays them on the screen. There can be more data in display memory that fits on the screen. The contents of display memory can be routed to a hard disk, a floppy disk, a printer, or a host computer. Also see *page memory*.

DOS

Disk Operating System.

download

The process of transferring data from another system to your own.

DSR

(Data set ready) A signal set on modem pin 6 (RS-232 standard) and sent to a device to indicate that the modem is ready to accept data. Most modems automatically set this signal *on* as soon as power is supplied to the modem, but not all modems use DSR. Compare *DTR*.

DTE

(Data terminal equipment) Equipment at which communications begin or end (e.g., a computer or terminal).

DTR

(Data terminal ready) A signal set *on* by a terminal on pin 20 of an RS-232 cable to indicate that the terminal is ready for data communications. Some modems terminate a connection after this signal has been absent for a period of time.

echo

A host computer is said to *echo* if it immediately transmits back to the source each character that it receives.

ENQ

(Enquiry) A character used to request a response. It may be part of the initialization sequence or the final character of a polling sequence. Compare *ACK*.

escape character

[Esc] or the escape character, usually shown as ^{ES}C. See also *literal escape*.

escape sequence

A character string beginning with the ASCII escape character. Such a string constitutes a command, usually to the terminal, to perform some action. Escape sequences are usually sent to a terminal from a host computer, but they can also be entered at the keyboard (press **[Esc]** followed by the sequence). To express escape in command language, use [^][], as in this sequence, which puts you in ReGIS mode: `DISPLAY ^[P3p]`. Compare *control sequence* and *device control string*.

field

A part of a record designed to hold one category of data. For example, a mailing list would contain fields for name, address, and zip code. See *record*, *file*.

file

A body of data stored at one location on a hard disk or floppy disk under a unique filename. A file can contain random data, such as text, or can be organized as records, which in turn would contain one or more fields.

fixed-length record format

A file format in which all records have the same length.

flow control

The pacing of data in a transmission to ensure that the receiving station can absorb the data that has already been sent, before sending more.

form feed

The movement of paper in a printer up to the next page. The term is derived from the fact that the form (paper) feeds (moves up) to the start of the next sheet.

frame

An elementary block of data for transmission by certain protocols. The term derives from character-oriented protocols that add special start-of-frame and end-of-frame characters when transmitting packets.

FTP

(File Transfer Protocol) The Internet standard high-level protocol for transferring files from one machine to another over TCP/IP networks. FTP uses TCP to deliver its data. FTP is part of the Internet Protocol Suite.

full duplex

The data communications mode that allows data to be transmitted in two directions simultaneously. Reflection always operates in full duplex, even if the host computer does not echo data entered at the terminal. Compare *half duplex*.

graphics display

The display of information in the form of graphs, charts, or pictures. Input from the keyboard is interpreted as coordinate point information.

graphics input mode

Mode that allows the host to detect screen location information. The crosshair cursor is turned on in this mode.

graphics mode

The PC's video card is set to a graphics state or mode when you run Reflection 2 bit-mapped (R2 /B132), or when you toggle into graphics mode in Reflection 4. In graphics mode, all alphanumeric characters are displayed in bit-mapped graphics. This is not the same as being in Tektronix graphics display mode; see *graphics display*.

graphics plot mode

Screen mode in which graphics data is displayed.

half duplex

A communications link that can transmit only in one direction at a time. Compare *full duplex*.

handshake

A protocol exchange of characters between a terminal and a host computer. The handshake delays transmission until a receiver is prepared to receive data.

host computer

Any computer that receives data from and transmits data to a terminal over communications lines. A host computer can be a mainframe or a minicomputer (such as a VMS or UNIX machine).

IRQ

(Interrupt request) A signal sent from a device to the interrupt handler of a PC's microprocessor. Different IRQs are assigned to different devices, arranged in a hierarchy. The particular assignment of IRQs varies from PC to PC.

K

The symbol for kilo, a thousand. Used, for example, to express the capacity of computer or disk memory, in thousands of bytes (kilobytes). One kilobyte actually equals 1,024 bytes.

LAT

(Local Area Transport) A Digital Equipment Corporation proprietary protocol for connecting to DEC VAX systems and DEC or third-party terminal services. The VMS operating system uses this protocol on LANs.

linefeed

An ASCII control character that moves the cursor or the form (paper) to the next line of text.

literal escape

The literal escape character tells Reflection to take the next character at face value, rather than as a special character. The default literal escape character is a backslash (\). Because the backslash is used in DOS path names, use a double backslash (\\) to specify the backslash character in a quoted string. Use the SET LITERAL-ESCAPE parameter to change the literal escape character (see the Reflection *Command Language* manual for details).

local mode

A mode of terminal operation in which data is not transmitted to a host computer. If data is received by a host computer while a terminal is operating in local mode, the data is discarded. Compare *remote mode*.

mnemonic

A mnemonic is an abbreviated name for a control character or escape sequence. DEC uses mnemonics for most of its control functions; the mnemonic for the cursor position control function, for instance, is CUP. A summary of control functions sorted by their mnemonics begins on page 703.

mode

The current operating state of the terminal. In Reflection 4 you might be in VT terminal emulation mode or Tektronix emulation mode. Within the Tektronix emulation you may be in alpha or graphics display mode.

modem

A contraction of the words modulator and demodulator. A modem converts digital signals from a computer to analog (sound) signals for transmission over a phone line, and converts analog signals received through a phone line to digital signals.

NAK

(No acknowledgement) A character sent to indicate negative acknowledgment of the preceding data or command. See ENQ, ACK.

node

An individual computer system in a network.

null modem

A cable arrangement in asynchronous serial communications directly connecting two pieces of terminal equipment with RS-232 cable so that the sending wire on one end becomes the receiving wire on the other end.

operating system

A master control program for a computer that manages basic operations, including apportioning memory, ordering tasks, and managing the flow of information into and out of the main processor. The central core remains in memory at all times. The operating system sets the standards for applications that run on it. MS-DOS and VMS, for example, are operating systems.

page memory

Memory in a VT420 terminal and a PC running Reflection that a host can address. The 144 lines of page memory are divided into pages; select from several standard page sizes in the Advanced Display Setup dialog box.

parallel transmission

The movement of data more than one bit at a time. This is accomplished by a cable that has a separate line for each bit position. For example, the IBM PC's parallel printer interface sends eight bits (i.e., one byte) in parallel. Compare *serial transmission*.

parameter

A value that can vary but that remains constant in a given context.

parity

An error-detection method that adds a non-information bit to each character transmitted. The bit may be always 0 (space parity), always 1 (mark parity), or either 0 or 1 so as to make the sum of the bits odd (odd parity) or even (even parity).

PC

Personal computer.

PCSA

(Personal Computer Systems Architecture) Digital Equipment Corporation's systems and networking architecture, which merges VMS, DOS, and OS/2 operating environments and is based on a client/server model. Now part of Digital's PATHWORKS.

pixel

Smallest unit of a graphics image. When a pixel is off, it is black; when it is on, it is white.

port

A jack or outlet on a computer, into which connectors to peripheral devices can be plugged. Usually designated either serial or parallel.

prompt

A symbol on a computer screen, telling the user that the computer is ready to receive a command. Sometimes a prompt is a message on the screen, telling the user to perform some action or indicating the status of an operation.

protocol

A formal set of rules governing the operation of a communications link.

receive pacing

A procedure that controls the rate at which data can be transmitted from the host or network server to the PC.

record

A collection of related pieces of information grouped together as part of a file, e.g., the name, street address, city, state, and zip code of one individual or company in a mailing list file. See *field*, *file*.

remote mode

A mode of terminal operation in which data is transmitted to and received from a host computer. Compare *local mode*.

RS-232

A standard cable type used to connect data communications equipment. The standard specifies the meaning of each of the lines connecting the equipment and the allowable ranges of voltage and impedance. A 9-pin or 25-pin connector is typically used.

RTS

(Request to send) A signal set on modem pin 4 (RS-232 standard) sent from the terminal/transmitting station to the modem requesting permission to transmit. Compare *CTS*.

serial port

A communications port through which data moves over a single wire, one bit after another.

serial transmission

A method of data transfer in which one bit is sent at a time. Compare *parallel transmission*.

sixel

A sixel is a vertical column of six pixels used to display graphics images.

start bits

Bits transmitted before each data character to signal the beginning of the character.

status request

A request issued by a host computer for information from a terminal.

stop bits

Bits transmitted after each data character to signal the end of the character.

terminal

A device that can feed information and receive data from a host computer. A PC becomes a terminal when it is connected to a host computer.

timeout

The process in which an intended operation is assumed to have failed because it was not completed within a specified amount of time.

transmit pacing

A procedure that controls the rate at which data can be transmitted from the PC to the host or network server.

TSR

(Terminate and stay resident) A program that installs itself in memory and then returns control to the program that invoked it (usually COMMAND.COM).

UART

(Universal Asynchronous Receiver/Transmitter) A device that receives and transmits data asynchronously and checks incoming data for errors. It is capable of halting transmission when certain events occur, such as the receipt of a character or line error. A common UART is the INS 8250.

upload

The process of moving data from your computer to another system.

variable

An unspecified value or quantity.

variable-length record format

A file format in which records are not necessarily the same length.

VAX

(Virtual Address Extender) A series of minicomputers from Digital Equipment Corporation.

vector

In graphics, a line extending from one display position to another; i.e., point to point.

VMS

(Virtual Memory System) An operating system for Digital VAX minicomputers.

wildcard

In MS-DOS and in Reflection file transfer, the symbol "?" is used in place of single characters in filenames or extensions; "*" is used in place of whole or partial filenames or extensions, indicating *all* for the given field.



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CS<n1>;...<n5>\$x	DECFRA	Fill rectangular area	566
CS<n1>;...<n6>*y	DECRCRA	Request memory checksum	564
CS<n1>;...<n8>\$v	DECCRA	Copy rectangular area	565
CS<n1>;...<nn>\$r	DECCARA	Change attributes in rectangular area	567
CS<n1>;...<nn>\$t	DECRARA	Reverse attributes in rectangular area	567
CS<row>;<col>f	HVP	Move cursor to horizontal and vertical position	552
CS<row>;<col>H	CUP	Cursor position	552
CS<row>;<col>R	CPR	Report cursor position	609
CS<row>;<col>;<page>R	DECXCPR	Report cursor position	610
CS<t>;r	DECSTBM	Set top and bottom scrolling region margins	558
CS<0>"q	DECSCA	Select erasable character	572
CS<0>\${	DECSASD	Main screen is the active display	556
CS<0>\$~	DECSSDT	Do not display status line	556
CS<0>\$!	DECSCPP	Select 80 columns per page	557
CS<0>;1234c	WRQRQSN	Serial number request	540
CS<0>c	DA	Request primary device attributes	606
CS<0>g	TBC	Tab clear	628
CS<0>i	MC	Text print screen	582
CS<0>J	ED	Erase from cursor to end of screen	571
CS<0>K	EL	Erase from cursor to end of line	571
CS<0>n	DSR	Report no device malfunction	609
CS<0>x	DA	Request terminal parameters	607
CS<1>"q	DECSCA	Select protected character	572
CS<1>132\$!	DECSCPP	Select 132 columns per page	557
CS<1>80\$!	DECSCPP	Select 80 columns per page	557
CS<1>1\$}	DECSASD	Status line is the active display	556
CS<1>1\$~	DECSSDT	Status line is indicator	556
CS<1>1\$u	DECRCQTSR	Request terminal state report	611
CS<1>1\$w	DECRCQPSR	Request cursor information report	612
CS<1>12h	SRM	Local echo off	555
CS<1>12l	SRM	Local echo on	555
CS<1>144t	DECSLPP	1 page, 144 lines	560
CS<1>1J	ED	Erase from top of screen to cursor	571
CS<1>1K	EL	Erase from beginning of line to cursor	572
CS<1>1x	DA	Request terminal parameters	607

Control Function	Mnemonic	Description	Page
$cs_{i2} * q$	DECSCA	Select erasable character	572
$cs_{i2} \$ \sim$	DECSSDT	Status line is host writable	556
$cs_{i2} \$ u$	DECQRQTSR	Request color table report (VT340)	622
$cs_{i2} \$ w$	DECQRQPSR	Request tab stop report	613
$cs_{i2}; <n1>; <n2>; <receive\ baud>; <transmit\ baud>; 1; \emptyset x$	DA	Response to $cs_{i0} x$	607
$cs_{i2}; <c1>; <c2> m$	—	(ANSI) Set default foreground and background colors	550
$cs_{i2} \emptyset h$	LNM	Auto linefeed on	573
$cs_{i2} \emptyset l$	LNM	Auto linefeed off	573
$cs_{i2} 4 t$	DECSLPP	6 pages, 24 lines each	560
$cs_{i2} 5 t$	DECSLPP	5 pages, 25 lines each	560
$cs_{i2} h$	KAM	Keyboard lock	573
$cs_{i2} J$	ED	Erase entire screen	571
$cs_{i2} K$	EL	Erase entire line	571
$cs_{i2} l$	KAM	Keyboard unlock	573
$cs_{i3} <n> m$	—	(ANSI) Set foreground color	550
$cs_{i3}; <n1>; <n2>; <receive\ baud>; <transmit\ baud>; 1; \emptyset x$	DA	Response to $cs_{i1} x$	607
$cs_{i3}; \emptyset m$	—	(ANSI) Turn off blink bit (16 colors allowed)	550
$cs_{i3}; 1 m$	—	(ANSI) Turn on blink bit (8 colors allowed)	551
$cs_{i3} g$	TBC	Clear all tabs	628
$cs_{i3} h$	—	Display controls on	559
$cs_{i3} l$	—	Display controls off	559
$cs_{i3} n$	DSR	Report device malfunction	609
$cs_{i3} 6 t$	DECSLPP	4 pages, 36 lines each	560
$cs_{i4} <n> m$	—	(ANSI) Set background color	550
$cs_{i4} h$	IRM	Insert mode	570
$cs_{i4} i$	MC	Printer controller mode off	581
$cs_{i4} l$	IRM	Replace mode	570
$cs_{i4} 8 t$	DECSLPP	3 pages, 48 lines each	560
$cs_{i5} i$	MC	Printer controller mode on	581
$cs_{i5} n$	DSR	Request operating status	609
$cs_{i6} 1 * p$	DECSCCL	VT100 emulation	543
$cs_{i6} <n> * p$	DECSCCL	VT400 emulation 8-bit controls	534
$cs_{i6} <n>; 1 * p$	DECSCCL	VT400 emulation 7-bit controls	534
$cs_{i6} <n>; 2 * p$	DECSCCL	VT400 emulation 8-bit controls	534
$cs_{i6} n$	CPR	Request cursor position	609
$cs_{i7}; <c1>; <c2> m$	—	(ANSI) Set default foreground and background colors (reverse video)	550
$cs_{i7} 2 t$	DECSLPP	2 pages, 72 lines each	560
$cs_{i7} c$	DA	Request primary device attributes	606
$cs_{i7} g$	TBC	Tab clear	628
$cs_{i7} i$	MC	Text print screen	582
$cs_{i7} 4 y$	DECTST	Terminal test (disconnect)	629
$pc_{s7} q \dots s_T$	DECQRQSS	Request control function setting	621
$pc_{s7} <n>; <n>; P3; qs \dots s_{s_T}$	—	Sixel data format	586

Control Function	Mnemonic	Description	Page
Dcs<C>\$w<def1>;<def2>;...;<defn> ST	DECLBD	Define locator device buttons (mouse)	590
Dcs<C>;<L> <defn> ST	DECUDK	Load user-defined keys	575
Dcs<n>\$r... ST	DECRPSS	Report control function setting	621
Dcs<n>!~D...D ST	DECKSR	Report memory checksum of macros	565
Dcs<n1>;<n2>;<n3>!zD...D ST	DECDMAC	Define macro	568
Dcs0!u%5 ST	DECAUPSS	Report UPSS is DEC Supplemental Graphic	605
Dcs0p	—	Enter ReGIS at point command exited	584
Dcs1;1;2 (<SP>@ ST	DECDLD	Clear downline loadable character set	604
Dcs1!uA ST	DECAUPSS	Report UPSS is ISO Latin-1 supplemental	605
Dcs1\$p... ST	DECRSTS	Restore terminal state from DECTSR	612
Dcs1\$s... ST	DECTSR	Report terminal state	611
Dcs1\$t... ST	DECRSPS	Restore cursor from DECCIR	618
Dcs1\$u... ST	DECCIR	Report cursor information	612
Dcs1234;Ps(<cmd> ST	WRQCMD	Invoke Reflection command	539
Dcs1p	—	Enter ReGIS and begin new command	584
Dcs2p	—	Enter ReGIS at point command exited	584
Dcs3p	—	Enter ReGIS and begin new command	584
Dcsp	—	Enter ReGIS at point command exited	584
Dcs2\$p<data> ST	DECRSTS	Restore color table (VT340)	622
Dcs2\$s<data> ST	DECCTR	Report color table (VT340)	622
Dcs2\$t... ST	DECRSPS	Restore tab from DECTABSR	618
Dcs2\$u... ST	DECTABSR	Report tab stop	617
DcsPfn;Pcn;Pe;PcmW;Pw;Pt;Pcmh;Pcss{ Dscs UUUUUUU/LLLLLLLL;... ST	DECDLD	Downline loadable character set	602
Esc(<chr>	SCS	Selects G0	594
Esc(<chr>	SCS	Selects G1, 94-character set	594
Esc-<chr>	SCS	Selects G1, 96-character set	594
Esc*<chr>	SCS	Selects G2, 94-character set	594
Esc+<chr>	SCS	Selects G3, 94-character set	594
Esc.<chr>	SCS	Selects G2, 96-character set	594
Esc/<chr>	SCS	Selects G3, 96-character set	594
Esc<	DECSCL	ANSI mode—exit VT52 emulation	629
Esc=	DECKPAM	Keypad mode application	574
Esc=	—	Keypad mode application (VT52)	630
Esc>	DECKPNM	Keypad mode normal	574
Esc>	—	Keypad mode normal (VT52)	630
Esc\	—	Exit ReGIS mode	584
Esc]	—	Print screen (VT52)	631
Esc^	—	Auto print mode on (VT52)	631
Esc_	—	Auto print mode off (VT52)	631
Esc	LS3R	Map G3 into GR	596
Esc}	LS2R	Map G2 into GR	596
Esc~	LS1R	Map G1 into GR	596
Esc#3	DECDDL	Double-width and height line (top half)	548

Control Function	Mnemonic	Description	Page
$E_{Sc}\#4$	DECDHL	Double-width and height line (bottom half)	548
$E_{Sc}\#5$	DECSWL	Single-width and height line	548
$E_{Sc}\#6$	DECDWL	Double-width and single-height line	548
$E_{Sc}\#8$	DECALN	Test pattern	629
$E_{Sc}\&bN$	—	Next session	541
$E_{Sc}\&bR$	—	Connection reset/suspend session	541
$E_{Sc}\&f<attr><key><label\ length><string\ length><label><string>$	—	Define softkeys programmatically	542
$E_{Sc}\&oD$	—	Refresh screen	542
$E_{Sc}\&oR$	—	Display softkey labels	541
$E_{Sc}\&oS$	—	Display main menu labels	541
$E_{Sc}\&oT$	—	Display PF key labels	541
$E_{Sc}\&OU$	—	Display status line (VT320)	541
$E_{Sc}/0d$	—	Tektronix drawing mode: dots on	585
$E_{Sc}/1d$	—	Tektronix drawing mode: dots off	585
$E_{Sc}/2d$	—	Tektronix drawing mode: complement dots	585
$E_{Sc}<SP>F$	S7C1T	VT200 emulation 7-bit controls	543
$E_{Sc}<SP>G$	S8C1T	VT200 emulation 8-bit controls	544
$E_{Sc}6$	DECBI	Backward index	553
$E_{Sc}7$	DECSC	Save cursor state	624
$E_{Sc}8$	DECRC	Restore cursor state	624
$E_{Sc}9$	DECFI	Forward index	553
$E_{Sc}A$	—	Cursor up (VT52)	630
$E_{Sc}B$	—	Cursor down (VT52)	630
$E_{Sc}C$	—	Cursor forward (VT52)	630
$E_{Sc}C$	RIS	Reset to initial state (hard reset)	626
$E_{Sc}D$	—	Cursor backward (VT52)	630
$E_{Sc}D$	IND	Index	553
$E_{Sc}E$	NEL	Next line	553
$E_{Sc}F$	—	Enter graphics mode (VT52)	629
$E_{Sc}G$	—	Exit graphics mode (VT52)	629
$E_{Sc}H$	—	Home cursor (VT52)	630
$E_{Sc}H$	—	Set tab	628
$E_{Sc}I$	—	Reverse linefeed (VT52)	631
$E_{Sc}J$	—	Erase from cursor to end of screen (VT52)	630
$E_{Sc}K$	—	Erase to end of line (VT52)	630
$E_{Sc}M$	RI	Reverse linefeed	553
$E_{Sc}n$	LS2	Map G2 into GL	596
$E_{Sc}N$	SS2	Map G2 into GL for next character	596
$E_{Sc}O$	LS3	Map G3 into GL	596
$E_{Sc}O$	SS3	Map G3 into GL for next character	596
$E_{Sc}V$	—	Print cursor line (VT52)	631
$E_{Sc}W$	—	Printer controller mode on (VT52)	631
$E_{Sc}X$	—	Printer controller mode off (VT52)	631
$E_{Sc}Y<r><c>$	—	Cursor to $<r>$ row $<c>$ col (VT52)	630

Control Function	Mnemonic	Description	Page
ES _C Z	—	Request primary device attributes (VT52)	630
ES _C ?		(Tektronix mode) Delete	585
ES _C CA _N		(Tektronix mode) Set bypass condition	585
ES _C PN _Q		(Tektronix mode) Status request	585
ES _C ET _B		(Tektronix mode) Print screen	585
ES _C FF		(Tektronix mode) Page/erase display	585
ES _C SU _B		(Tektronix mode) Enter GIN mode	596
S _I	LS0	Map G0 into GL	596
S _O	LS1	Map G1 into GL	



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Mnemonic	Function	Description	Page
CPR	$C_{SI} < row > ; < col > R$	Report cursor position	609
CPR	$C_{SI} 6n$	Request cursor position	609
CUB	$C_{SI} < n > D$	Cursor backward	552
CUD	$C_{SI} < n > B$	Cursor down	553
CUF	$C_{SI} < n > C$	Cursor forward	552
CUP	$C_{SI} < r > ; < c > H$	Cursor position	552
CUU	$C_{SI} < n > A$	Cursor up	552
DA	$C_{SI} 2 ; < n1 > ; < n2 > ; < receive\ baud > ; < transmit\ baud > ; 1 ; 0x$	Response to $C_{SI} 0x$	607
DA	$C_{SI} 3 ; < n1 > ; < n2 > ; < receive\ baud > ; < transmit\ baud > ; 1 ; 0x$	Response to $C_{SI} 1x$	607
DA	$C_{SI} > 0c$	Request secondary device attributes	609
DA	$C_{SI} > 24 ; 11 ; 0c$	Response to secondary device attributes	609
DA	$C_{SI} > c$	Request secondary device attributes	609
DA	$C_{SI} 0c$	Request primary device attributes	606
DA	$C_{SI} 0x$	Request terminal parameters	607
DA	$C_{SI} 1x$	Request terminal parameters	607
DA	$C_{SI} c$	Request primary device attributes	606
DCH	$C_{SI} < n > P$	Delete $< n >$ characters from cursor	570
DECALN	$E_{SC} \# 8$	Test pattern	629
DECANM	$C_{SI} ? 21$	VT52 emulation	629
DECARM	$C_{SI} ? 8h$	Keyboard auto repeat on	573
DECARM	$C_{SI} ? 8l$	Keyboard auto repeat off	573
DECAUPSS	$D_{CS} 0 ! u \# 5 S_T$	Report UPSS is DEC supplemental graphic	605
DECAUPSS	$D_{CS} 1 ! u A S_T$	Report UPSS is Latin-1 supplemental	605
DECAWM	$C_{SI} ? 7h$	Autowrap on	574
DECAWM	$C_{SI} ? 7l$	Autowrap off	574
DECBI	$E_{SC} 6$	Backward index	553
DECBKM	$C_{SI} ? 67h$	Backarrow key set to BS (ASCII decimal 8)	575
DECBKM	$C_{SI} ? 67l$	Backarrow key set to DT (ASCII decimal 127)	575
DECCARA	$C_{SI} < n1 > ; \dots < nn > \r	Change attributes in rectangular area	567
DECCIR	$D_{CS} 1 \$ u \dots S_T$	Report cursor information	612
DECCKM	$C_{SI} ? 1h$	Cursor keys application	574
DECCKM	$C_{SI} ? 1l$	Cursor keys normal	574
DECCCKSR	$C_{SI} ? 63 ; < n > n$	Request memory checksum of macros	564
DECCOLM	$D_{CS} < n > ! \sim D \dots D S_T$	Response to memory checksum of macros request	565
DECCOLM	$C_{SI} ? 3h$	Columns 132	557
DECCRA	$C_{SI} ? 3l$	Columns 80	557
DECCTR	$C_{SI} < n1 > ; \dots < n8 > \v	Copy rectangular area	565
DECCTR	$D_{CS} 2 \$ s < data > S_T$	Report color table	622

Mnemonic	Function	Description	Page
DECDC	$CS_I<n>' \sim$	Delete column	571
DECDDL	$ESC\#4$	Double-width and height line (bottom half)	548
DECDDL	$ESC\#3$	Double-width and height line (top half)	548
DECIC	$CS_I<n>' \}$	Insert column	570
DECILD	$DCS1;1;2 \{ <SP>@^S_T$	Clear downline loadable character set	604
DECILD	$DCSPfn;Pcn;Pe;PcmW;Pw;Pt \{ Dscs \text{ UUUUUUU/LLLLLLL;...}^S_T$	Downline loadable character set	602
DECDMAC	$DCS<n1>;<n2>;<n3>!zD...^D^S_T$	Define macro	568
DECDWL	$ESC\#6$	Double-width and single-height line	548
DECERA	$CS_I<n1>;...<n4>\$Z$	Erase rectangular area	565
DECFI	$ESC9$	Forward index	553
DECFRA	$CS_I<n1>;...<n5>\$X$	Fill rectangular area	566
DECGEPM	$CS_I?43h$	Expanded print mode	582
DECGEPM	$CS_I?43l$	Compressed print mode	582
DECGPBM	$CS_I?46h$	Print background	583
DECGPBM	$CS_I?46l$	Do not print background	583
DECGPCM	$CS_I?44h$	Print color mode	582
DECGPCM	$CS_I?44l$	Print monochrome mode	582
DECGPCS	$CS_I?45h$	Print color syntax set to RGB	583
DECGPCS	$CS_I?45l$	Print color syntax set to HLS	583
DECGRPM	$CS_I?47h$	Print rotated mode	582
DECGRPM	$CS_I?47l$	Print compressed mode	582
DECINVM	$CS_I<n>*Z$	Invoke macro	569
DECKPAM	$ESC=$	Keypad mode application	574
DECKPAM	$ESC>$	Keypad mode normal	574
DECLBD	$DCS<C>\$w<d1>;...;<dn>^S_T$	Define locator device buttons (mouse)	590
DECMSR	$CS_I?62n$	Request macro report	569
DECNKM	$CS_I?66h$	Numeric keypad mode application	574
DECNKM	$CS_I?66l$	Numeric keypad mode numeric	574
DECNRCM	$CS_I?42h$	Use national replacement: 7-bit	599
DECNRCM	$CS_I?42l$	Use national replacement: 7- and 8-bit	599
DECOM	$CS_I?6h$	Origin mode set	559
DECOM	$CS_I?6l$	Origin mode reset	559
DECPCCM	$CS_I?64h$	Page cursor: couple	563
DECPCCM	$CS_I?64l$	Page cursor: decouple	563
DECPEX	$CS_I?19h$	Print full screen	580
DECPEX	$CS_I?19l$	Print scrolling region	580
DECPFF	$CS_I?18h$	Form feed after PrtSc yes	580
DECPFF	$CS_I?18l$	Form feed after PrtSc no	580
DECRARA	$CS_I<n1>;...<nn>^S_T$	Reverse attributes in rectangular area	567
DECRC	$ESC8$	Restore cursor state	624
DECRPDE	$CS_I<n1>;...<n5>;"W$	Report displayed extent	625
DECRPM	$CS_I<n1>;<n2>\$Y$	Report ANSI mode settings	619
DECRPM	$CS_I?<n1>;<n2>\$Y$	Report DEC private mode settings	619
DECRPSS	$DCS<n>\$r...^S_T$	Report control function setting	621
DECRQCRA	$CS_I<n1>;...<n6>*Y$	Request memory checksum	564
DECRQDE	$CS_I"V$	Request displayed extent	625
DECRQM	$CS_I?<n>\$P$	Request DEC private mode settings	618
DECRQM	$CS_I<n>\$P$	Request ANSI mode settings	618

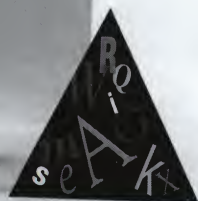
Mnemonic	Function	Description	Page
DECRCPSR	C _{SI} 1\$w	Request cursor information report	612
DECRCPSR	C _{SI} 2\$w	Request tab stop report	613
DECRCSS	D _{CS} \$q...s _T	Request control function setting	621
DECRCQTSR	C _{SI} 1\$u	Request terminal state report	611
DECRCQTSR	C _{SI} 2\$u	Request color table report (VT340)	622
DECRCQPSS	C _{SI} &u	Request UPSS	605
DECRCSPS	D _{CS} 1\$t...s _T	Restore cursor from DECCIR	618
DECRCSPS	D _{CS} 2\$t...s _T	Restore tab from DECTABSR	618
DECRCSTS	D _{CS} 1\$p...s _T	Restore terminal state from DECTSR	612
DECRCSTS	D _{CS} 2\$p<data>s _T	Restore color table	622
DECSACE	C _{SI} <n>*x	Select attribute change extent	566
DECSASD	C _{SI} 0\$}	Main screen is the active display	556
DECSASD	C _{SI} 1\$}	Status line is the active display	556
DECSA	E _{SC} 7	Save cursor state	624
DECSA	C _{SI} 0*q	Select erasable character	572
DECSA	C _{SI} 1*q	Select protected character	572
DECSA	C _{SI} 2*q	Select erasable character	572
DECSCL	C _{SI} 61*p	VT102 emulation	543
DECSCL	C _{SI} 6<n>*p	VT400 emulation 8-bit controls	543
DECSCL	C _{SI} 6<n>;0*p	VT400 emulation 8-bit controls	543
DECSCL	C _{SI} 6<n>;1*p	VT400 emulation 7-bit controls	543
DECSCL	C _{SI} 6<n>;2*p	VT400 emulation 8-bit controls	543
DECSCL	E _{SC} <	ANSI mode—exit VT52 emulation	629
DECSCLM	C _{SI} ?4h	Smooth scroll	554
DECSCLM	C _{SI} ?4l	Jump scroll	554
DECSA	C _{SI} ?5h	Inverse video	554
DECSA	C _{SI} ?5l	Normal video	554
DECSA	C _{SI} 132\$	Select 132 columns per page	557
DECSA	C _{SI} \$	Select 80 columns per page	557
DECSA	C _{SI} 0\$	Select 80 columns per page	557
DECSA	C _{SI} 80\$	Select 80 columns per page	557
DECSA	C _{SI} ?80h	Disable sixel scrolling	589
DECSA	C _{SI} ?80l	Enable sixel scrolling	589
DECSA	C _{SI} ?0J	Selective erase from cursor to end of screen	572
DECSA	C _{SI} ?1J	Selective erase from top of screen to cursor	572
DECSA	C _{SI} ?2J	Selective erase of screen	572
DECSA	C _{SI} ?0K	Selective erase from cursor to end-of-line	572
DECSA	C _{SI} ?1K	Selective erase from beginning of line to cursor	572
DECSA	C _{SI} ?2K	Selective erase of line	572
DECSA	C _{SI} <n1>;...<n4>\$ {	Selective erase of rectangular area	566
DECSLPP	C _{SI} 24t	6 pages, 24 lines each	560
DECSLPP	C _{SI} 25t	5 pages, 25 lines each	560
DECSLPP	C _{SI} 36t	4 pages, 36 lines each	560
DECSLPP	C _{SI} 48t	3 pages, 48 lines each	560
DECSLPP	C _{SI} 72t	2 pages, 72 lines each	560
DECSLPP	C _{SI} 144t	1 page, 144 lines	560
DECSLRM	C _{SI} <n1>;<n2>s	Set left and right margins	558
DECSNLS	C _{SI} <n>*i	Set number of lines per screen	555

Mnemonic	Function	Description	Page
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DECSRC	$CS_I<n>*Q$	Reset confirmation	627
DECSSDT	$CS_I0\$~$	No status line	556
DECSSDT	$CS_I1\$~$	Status line is indicator	556
DECSSDT	$CS_I2\$~$	Status line is host writable	558
DECSTBM	$CS_I<t>;R$	Set top and bottom scrolling region margins	627
DECSTR	$CS_I!P$	Reset to defaults—soft reset (VT300)	548
DECSWL	$ES_C\#5$	Single-width and height line	617
DECTABSR	$DC_S2\$U\dots S_T$	Report tab stop	551
DECTCEM	$CS_I?25h$	Cursor visible	551
DECTCEM	$CS_I?25l$	Cursor invisible	611
DECTSR	$DC_S1\$S\dots S_T$	Report terminal state	629
DECTST	CS_I4y	Terminal test (disconnect)	575
DECUDK	$DC_S<C>;<L> <defn>S_T$	Load user-defined keys	562
DECVCCM	$CS_I?61h$	Vertical cursor: couple	562
DECVCCM	$CS_I?61l$	Vertical cursor: decouple	559
DECVSSM	$CS_I?69h$	Margins can be set by DECSLRM	559
DECVSSM	$CS_I?69l$	Margins cannot be set by DECSLRM	571
DL	$CS_I<n>M$	Delete $<n>$ lines from cursor	610
DSR	$CS_I?10n$	Report printer ready	610
DSR	$CS_I?13n$	Report no printer	610
DSR	$CS_I?15n$	Request printer status	610
DSR	$CS_I?20n$	Report UDKs unlocked	610
DSR	$CS_I?21n$	Report UDKs locked	610
DSR	$CS_I?25n$	Request UDK status (VT200)	611
DSR	$CS_I?26n$	Request keyboard dialect	611
DSR	$CS_I?27; <n1>; <n2>; <n3>n$	Report keyboard dialect	622
DSR	$CS_I?50n$	Report a locator device detected	622
DSR	$CS_I?53n$	Report no locator device detected	622
DSR	$CS_I?55n$	Request status of locator device	622
DSR	$CS_I?56n$	Request type of locator device	622
DSR	$CS_I?57; 0n$	Report no locator device connected	622
DSR	$CS_I?57; 1n$	Report locator device is a mouse	609
DSR	CS_I0n	Report no device malfunction	609
DSR	CS_I3n	Report device malfunction	609
DSR	CS_I5n	Request operating status	571
ECH	$CS_I<n>X$	Erase $<n>$ characters on line	571
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ED	CS_I1J	Erase from top of screen to cursor	571
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